A view to a grill

Designing park infrastructure for Uusimaa parks

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As a designer there can be no bigger thrill than seeing something you made used and enjoyed. It was a privilege and a pleasure to design infrastructure for UUVI parks, and I can only hope that the results do the parks justice, and that they are enjoyed for years to come.

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Abstract

Deep relationships between people and the natural environment can be fostered in the smallest of interventions. This master's thesis of Collaborative and Industrial Design explores the research, design, and construction of small infrastructure for a Finnish provincial park association. UUVI (short for Uudenmaan Virkistysalueyhdistys) is a government-funded organization with 37 nature reserves ranging in size from 1.1 to 450 hectares. In many of these parks infrastructure is deteriorating, and new day use shelters, fire sites, woodsheds, and signposts are needed.

Grilling, hiking, foraging, and fishing are beloved summertime activities in Finnish culture and are cemented in law through the every-man's rights enjoyed in the country. The Finnish relationship with nature is a deep and cultural one. This thesis explores how built park infrastructure can foster the cultural connection with nature in Finnish parks.

Theoretical underpinnings of the nature-culture relationship are explored. Once seen in a dualistic manner, nature was seen to be a place absent of people. Since then, the understanding of nature in academic discourse has changed, and contemporary views of nature place humans within and part of it. Place can be defined as the space in which humans and landscape interact: where landscapes leave an impression on people and people leave an impression on the land. The benefits of nature experiences are well documented, and can be intentional or not. Ways in which park infrastructure can encourage and deepen nature experiences are explored.

In this project, five different park elements are designed, each with varying amounts of input from the different stakeholders involved. A wood stove specifically designed for grilling was conceptualized by UUVI Field Manager Mikael Avellan, and re-dimensioned and drawn for this thesis. A large woodshed was also co-designed with Avellan and includes a sliding roof for easier refilling. Signpost, bench, and shelter designs were influenced heavily by user research conducted in Kopparnäs-Störsvik park, as well as continued input from UUVI staff with their considerable experience. Research insights encouraged drawing the attention outwards from the shelters to promote incidental nature experiences; the use of more numerous but smaller shelters to disperse crowds; employing premium materials for longevity and to discourage vandalism; and the importance of accessibility.

Detailed dimensioned drawings were created for each project element, and are now in the process of being prototyped and constructed by various manufacturers.

INTRODUCTION

This project is a practical one: the design of several park elements for UUVI, Uusimaa's Parks Association. In total, five elements were designed or updated: a stove, benches and tables, signposts, a woodshed, and a shelter. UUVI is a government-funded, community operated organization with 37 parks ranging in size from 1.1 to 450 hectares, with the majority of the parks being under 30 hectares (Uudenmaan Virkistysalueyhdistys, 2019). Because of the amount of parks, the infrastructure must be affordable, long-lasting, easy to construct, and serve the park visitors well.

The project began with research in the form a literature review, user research through contextual inquiry, and co-creation with UUVI staff. The design process was somewhat less well defined, with many iterations passing from 3D models to renders to dimensioned drawings and back again. As each product is slated for production, many details needed to be ironed out—for example to reduce costs or cater to available materials—before drawings were adequate for manufacturers. Some of the designs have already been made and installed, such as the updated stove and the benches, while the others are still in the production process.

Throughout this project I worked closely with UUVI's amazing staff. Tapio Lepikkö, Executive Director, would help drive the style and experiential aspects of the designs. Silva Sallamaa, Specialist, helped me gain a deeper understanding of park visitors, and was instrumental in learning about and conforming to accessibility guidelines. Mikael Avellan, Field Manager, would have the largest influence in the process, as he will be responsible for the installation and maintenance of the designs.

Through research, collaboration with the UUVI team, and design, this project aims to address a simple question: How can park infrastructure improve visitor experiences to UUVI parks?

Project

The scope of this project is large, and covers many elements that needed to be designed. Within these elements, there were also variations to the designs that needed to be considered (benches would need

to be design with and without a back, for example). The scope of the project would prove to have both drawbacks and benefits. While the amount of deliverables within a tight timeframe would mean that less attention could be given to each element as one might want, it also meant that each element could contribute to a larger whole. Each piece of park furniture could follow similar materiality, aesthetics, and be designed to work together well.

Adding to the challenge of this project was it's rooting in reality: each element will be built and—at least—tested. Some or all might be produced in larger quantities for the parks. Designing for production introduces countless complications to a design project, including
hardware choices, material availability, manufacturing methods, repeatability, and tolerances. Designing for repeatability also had another implication: designs would need to be site agnostic. With every park having different characteristics of geography, density and usage, the designs would need to be flexible and cover many use-cases.

My role in the project would be to translate UUVI's needs, which largely centered around the practicalities of the design, including cost, longevity, and ease of maintenance, into designs that catered well to park visitors. In other words, park infrastructure that is inviting, functional, and that people enjoy using.

Literature review

People visit parks for the nature experiences that they can have there. Enjoyable infrastructure would elevate these experiences. Elevating this nature experience required knowing more about the human-nature relationship. This is explored through Cronon's germinal work on the subject, which aims to shift dualistic understandings of nature to a more holistic one. Continuing this work, Thomas Beery and other contemporary scholars aim to define place as the meeting of people and landscape. These discussions help define how design can help deepen nature experiences for park visitors.

Design Research

Desk research is clearly not adequate for a project like this one, and it was critical to better understand the parks and its visitors. To do this, I spent a week in Kopparnäs-Störsvik park enjoying the park, observing people there, and interview select groups. This research gave invaluable insights into how people use the park as well as some of the pain-points in their visits. This research was supplemented by a survey that UUVI conducted on the same park, as well as gathering insights from UUVI staff, who have intimate knowledge of the parks.

Design Process

After gaining insight into the project through the literature review and design research, designs needed to be produced. This process was a messy one, and included countless iterations and back-and-forth conversations with UUVI as well as manufacturers. Most of the work was done in Rhino 3D: 3D models would be used both to help visualise the forms and proportions of the various projects and to create the dimensioned drawings that would be sent to manufacturers for production. While some renders were made of the various objects, the main and most critical deliverables are these dimensioned drawings.

It was a privilege to work on this project. Knowing that the results would be manifested in reality in incredibly beautiful locations to be used and enjoyed was humbling, and I felt a strong sense of responsibility to produce fine results: to UUVI; to the people of Uusimaa; and indeed, to the parks themselves.

1. LITERATURE

Literature on the topic of park infrastructure is not plentiful. However, broadening the scope of research provides interesting avenues of thought. This project at its core touches upon the most basic interventions in the natural environment: a small shelter, a fire, a place to sit. For this reason, it felt appropriate to consider the human relationship with nature. What is nature? How does it affects us? And we it? Only through understanding our relationships with parks can that relationship be improved.

The second half of the literature review will explore the concept of "Place": how people can feel a sense of place in a park, and how infrastructure might deepen that experience.

What is nature?

In academia, the most common way to talk about nature is to consider it as an other. We talk about nature as if humanity is not a part of it—ignoring our own naturalness as well as our own influence on nature. This dualistic view of the nature-human relationship still pervades today, although this is changing (Beery and Wolf-Watz 2014). Cronon's The trouble with wilderness: or, getting back to the wrong nature is a prominent work challenging the division of nature and culture, and will form the basis for the arguments that follow. Understanding the human relationship with nature is important in the context of parks, which for many people serve as a main medium for this relationship.

The historical context of natural parks as areas devoid of human influence

As Cronon notes, the western perspective of wilderness is largely steeped in ideals of the sublime and of the frontier. These ideals ultimately led to the creation of the national park system in the United States, and colour our expectations of nature parks even today.

Until relatively recent times, Cronon describes, wilderness was considered to be a place to be feared, full of dangers, and without the safety of others. Wilderness "was to be "deserted," "savage," "desolate," "barren"—in short, a "waste," the word's nearest synonym" (Cronon 1996, p.8).

Romantic philosophers of the eighteenth century began to understand wilderness in a different light, however, and fear turned into reverence. "In the theories of Edmund Burke, Immanuel Kant, William Gilpin, and others, sublime landscapes were those rare places on earth where one had more chance than elsewhere to glimpse the face of God." (Cronon 1996, p. 10) This mode of thought was echoed by writers like John Muir and Henry David Thoreau, who were to become forebears of the environmental movement (Taylor 2016). Muir, writing about his experience of the North Dome in Yosemite: " I gaze . . . humbly prostrate before the vast display of God's power, and eager to offer self-denial and renunciation with eternal toil to learn any lesson in the divine manuscript." (Muir, 1911, cited in Cronon, 1996, p. 12) The sublime, then, understands wilderness to be the realm of god, and not of people.

Following this religious understanding of wilderness, people's views on nature became increasingly coloured by what Cronon calls the frontier mentality. Referencing the mythology of those American settlers who worked the land westward, this understanding of nature saw it as a place where men (and not women), were tested by the elements, and proved themselves to be worthy (Cronon 1996).

It was this frontier mentality that would eventually lead to the national park movement, as the dwindling availability of frontierlands would lead them to be perceived worthy of protection: "the myth of the vanishing frontier lay the seeds of wilderness preservation in the United States, for if wild land had been so crucial in the making of the nation, then surely one must save its last remnants as monuments to the American past" (Cronon 1996, p. 13). Theodore Roosevelt, who was to create the first national parks in the U.S. (Taylor 2016), referred to the "fine, manly qualities" of the "wild rough-rider of the plains" (Roosevelt, 1888, cited in Cronon, 1996, p. 14). Through the preservation of wilderness through parks, the experience of the frontier could be revived. Just as the sublime worldview sees nature as a place of god and not people, the frontier mentality sees wilderness as a place to be conquered, and thus free of people, for to conquer one must be

the first there.

The sublime and frontier colourations of nature persists today. Images of yoga practitioners or meditations in nature are so plentiful as to be iconic, or even cliché: although distanced from its christian roots, there exists a cultural understanding of nature as a spiritual place. The frontier mentality, too, continues to affect our perception of wilderness. It can be clearly seen in the messaging, marketing, and ethos of the outdoor recreation industry. Consider The North Face, an internationally recognised outdoor brand which uses the motto "Never Stop Exploring", and sponsors athletes like Alex Honnold, whose recent free solo climb (without ropes) of Yosemite's 900m cliff face El Capitan garnered global media attention (Synnott 2019). The latest technologically advanced equipment is marketed as propelling users to new heights, to travel further and faster, and to brave elements in which humans should have no place being.

Through the continued understanding of nature as a spiritual place or as a place to be conquered, the current mindset of many people towards wilderness is that it should be defined first and foremost by the absence of human presence. This, Cronon summarizes, "is the central paradox: wilderness embodies a dualistic vision in which the human is entirely outside the natural" (1996, p. 17).

The problem with a dualistic view of nature

The cultural perception of wilderness as of a place absent of people is problematic in many ways. It ignores the animal nature of our human species; that we have always been part and parcel of our natural environment. The result is the implication that humans cannot co-exist harmoniously with nature. If wilderness represents the natural world at its best, and we are not part of it, than any human intervention on the environment might be seen as destructive. This is not the case, as countless examples exist of people and cultures having amplifying relationships with their environment.

The problem runs deeper in that it promotes the preservation of untouched "wilderness" spaces at the

expense of others. The environmental movement has largely focused on the creation of nature preserves and the protection of endangered species at the expense of the health and diversity of urban and rural environments. This is not to say that parks are bad, but simply that the creation of a protected park does not absolve us from responsibility to other places. Idealizing uninhabited nature may also lead to the neglect of communities most in need: "problems of occupational health and safety in industrial settings, problems of toxic waste exposure on "unnatural" urban and agricultural sites, problems of poor children poisoned by lead exposure in the inner city, problems of famine and poverty and human suffering in the "overpopulated" places of the earth—problems, in short, of environmental justice." (Cronon 1996, p.20)

Place: a new lens through which to understand nature.

While Cronon outlines the problems of a dualistic view of the human-environment relationship, Beery and Wolf-Watz propose a solution by presenting an alternative framing of the topic altogether—the shift from thinking of nature as an other to the concept of "place", or the result of people's interactions with nature and vice versa.

The concept of place focuses on the human relationship with landscape: "a context specific experience with the more than human world." A sense of place arises from three components: "geographic location, material form, and an investment with cultural and subjective meaning". Place, then, is derived from the meanings that people assign to landscapes, bridging the gap between the physical and the cultural. "People construct their places, at both the level of representation and materiality, and at the same time places do have an impact on human way of life." Whether touched or untouched, urban or "wild", landscapes affect people, who in turn affect landscapes (Beery and Wolf-Watz 2014, p. 199, p. 203).

The notion of place therefore reconciles the Cartesian human nature divide by defining the meeting of each. Places may be more or less natural (having differing amounts of biodiversity), but none are

outside the influence of human interaction, just as people are never outside the influence of the natural world. Recognizing that people have meaningful nature experiences in all environments is wholly beneficial. The realization that everyone—from those living in remote locations to those in urban centers—is influencing and being influenced by their surroundings leads to the recognition that a positive sense of place can be derived in manifold ways. Nature experiences can be had and enjoyed in urban environments. Conversely, the built environment in parks can influence the sense of place—the cultural understanding of physical land—for its visitors.

Designing for place

Benefits of Nature

If place marks the experiential meeting of people and non-human life, fostering a sense of place entails enabling these connections. It is also worthwhile to explore why fostering place is important: the benefits, in other words, of conversing with nature.

Decades of research have shown multiple positive effects of increased connection to nature, including physical, mental, and social well-being (Beery et al. 2017, Capaldi et al. 2015, Keniger et al. 2013)

The recognition of the benefits of nature has led to action within policy. The EU Green Infrastructure Strategy 2013–2020 recognizes that green infrastructure not only improves biodiversity but also provides social and cultural benefits that manifest themselves in terms of human well-being and quality of life (European Commission 2013, as noted by Beery and Jönsson 2016 p. 57).

Closer to home, a survey of 3,060 Finnish people found a correlation between recreational nature-based activities and emotional well-being (Korpela et al. 2014).

There are three theories as to why connecting with nature is beneficial. The biophilia hypothesis suggests that as human survival depended on a connection with nature for the best part of history, this connection remains beneficial today. Attention restoration theory links the positive effects of nature to its ability to stimulate and engage our attention in a way that does not require focused thought or intention. Lastly, stress reduction theory contends that time spent in nonthreatening environments that were evolutionarily advantageous can lead to both psychological and physiological stress reduction (Capaldi et al. 2015).

Intentional vs incidental Nature Experiences

Most people visit parks in order to be in nature. This constitutes an intentional experience with nature. However, there are other avenues through which to experience nature. Interactions between people and nature follow three main patterns: indirect, incidental, and intentional interactions (*Table 1*) (Keniger et al. 2013). Indirect nature experiences are experiences with representations of nature (paintings, movies, etc.) or when one views a natural scene through a window. Intentional interactions with nature are those that people purposefully seek out. These might include outdoor recreational activities, foraging, or gardening and farming. Incidental interactions are those that are experienced unintentionally while doing another activity. These interactions might occur while travelling somewhere, or even during an intentional nature experience: seeing an animal while picking berries, for example (Beery et al. 2017).

Visits to parks are examples of intentional nature experiences, but are not excluded from the mystery and wonder that can come from an incidental nature experience. Beery et al. (2017) note one such example in Kristianstad, Sweden. A bridge spanning the Helge river enables foot traffic between the city center and Kristianstads Vattenrike, a large biosphere reserve that largely surrounds the city. People use the bridge both for transportation as well as to reach the park and visitor center as a final destination. On one occasion, the authors observed a group of students and teachers assembled on the bridge, waiting to start a class at the nearby visitor center. Their chatting, phone-checking, and shuffling was interrupted by the sound of a fish splashing in the river three meters below them. The source of the commotion was in fact two otters, who "proceeded to swim around, capturing and consuming fish within 5-10 meters of the student group". The students were captured in that moment: they were notably excited, discussed the event after the fact, and shared the moment on social media. This incidental nature experience was one that clearly left a mark. (Beery et al. 2017, p. 7)

In light of the positive outcomes of incidental

Table 1. Spectrum of nature experiences, adapted from Keniger et al. 2013 and Beery et al. 2017.

Indirect	**Incidental**	**Intentional**	**Incidental during intentional**
Experiencing nature while not being physically present in it (Keniger et al. 2013, p. 917)	Experiencing nature as a by-product of another activity (Keniger et al. 2013, p. 917)	Experiencing or being in nature through direct intention (Beery et al. 2017, p. 3)	Experiencing nature as a by-product of an intentional nature experience (Beery et al. 2017, p. 3)
Viewing nature in a picture, image, motion picture or through a window (Keniger et al. 2013, p. 917)	Noticing a colorful sunset while walking to the grocery store Getting wet during a sudden downpour while biking to work Appreciating fragrance from blooming trees while attending to outdoor household chores Hearing an interesting bird song while waiting for the bus (Beery et al. 2017, p. 3)	Wildlife observation in a park Gardening in one's yard Stargazing on a dark night Collecting shells and rocks on a beach Walking outdoors during a snowstorm Climbing a rock cliff (Beery et al. 2017, p.	Picking berries in a forest and discovering tracks from a wild animal Eating lunch outdoors to enjoy the weather and noting early autumn color change Mushroom foraging along a wooded path and being surprised by the unexpected movement of a snake (Beery et al. 2017, p. 3)

nature experiences, the authors make recommendations for the design of green infrastructure that enables these interactions. These recommendations are mainly applicable to urban environments, and enable incidental experiences to arise during the banality of day-to-day life by increasing the availability of nature-rich transportation corridors, for example, or increasing the biodiversity of landscaped areas. The recommendations pertaining to access to green infrastructure, however, are also applicable to intentional nature experiences (*Table 2*) (Beery et al. 2017).

Many of these recommendations pertain to the layout and planning of parks: the locations of pathways, furnishings, viewpoints, and wildlife structures. However, one can apply the same lessons to the park structures themselves. The most simple implementation might see a shelter that prioritizes and frames views, but more complex integrations of these recommendations are also possible. A shelter might include a green roof that provides more natural habitat for animals, or even have nesting boxes incorporated in the structure. Similarly, shelters might be combined into viewing platforms.

By creating park infrastructure in such a way that not only enables intentional nature experiences, but also increases the likelihood of incidental nature experiences when in use, a deeper connection to the nature of the park is fostered, and a richer sense of place is developed both for the visitor, and the park itself.

Table 2. Excerpt from "Recommendations for the integration of incidental nature experience design elements into landscape planning for daily nature experience opportunity" (Beery et al. 2017, p. 10)

Design Attribute	Design purpose
Water	Sensory experience of water via route proximity, bridges, docks, etc.
Views	Opportunity to look beyond the immediate, or to gain a protected view—overlooks, outlooks (observation towers), blinds, etc.
Wildlife	Structures to enhance wildlife habitat, e.g., nest boxes and platforms in proximity to human experience

Ecological aesthetic

One of the most important ways in which we understand a landscape lies in how we perceive its aesthetic beauty. We as humans have what seems to be a natural desire to live in and visit beautiful places, and avoid or improve undesirable or ugly places. The connection between aesthetics and landscape have had implications on policy around the world, and as explored previously, also influenced the creation of the national park movement, as the notion of sublime wilderness was intimately tied to the scenic qualities of nature. Later, aesthetics would be a key driver in deciding what areas to protect, as well as directing resource extraction activities to have less visual impact. This approach to land management can be problematic in that it prioritizes landscapes of aesthetic beauty over those of ecological richness. Gobster et al. (2007, p.962) propose that a shift can be encouraged from a scenic aesthetic to what they call an "ecological aesthetic"—or the perception of beauty as a function of a landscape's ecological processes. Wetlands, for example, despite displaying incredible biodiversity, may not fit the standards of scenic beauty, and as such may be perceived as being unhealthy and of low value. (Gobster et al. 2007)

Shifting what people perceive as beautiful can lead to greater protection of places that provide valuable ecosystem services but are not necessarily scenic. Other benefits may exist as well, as people are more likely to be physically active in aesthetically pleasing environments (Bedimo-Rung, Mowen and Cohen, 2005, Jongeneel-Grimen, B. et al. 2014). Extending people's perceptions of natural beauty might encourage healthier lifestyles.

Designing for the ecological aesthetic entails supporting a connection between the ecological health of a place and it's perceived beauty. More eloquently put: "design interventions are human actions that can change perceptible landscape patterns to build a closer correspondence between what is perceived and the valued functions of environmental phenomena outside the perceptible realm." (Gobster et al. 2007, p. 969) This can be done by either affecting the landscape (the perceived), or by affecting the viewer (who is perceiving). Taking the example of

a wetland, design interventions on the landscape might include boardwalks, delineated borders, or other features that "convey care, and foster more positive aesthetic experiences." (Gobster et al. 2007, p. 970) Focusing instead on the viewer and how they perceive the landscape might lead to interventions like interpretive signage (changing knowledge), viewing platforms (changing perspective), or more formal activities like guided tours, classes, or volunteer programs (changing environment). In the case of a natural park, where land management favours a light touch, these latter interventions focusing on the person's experience might be of higher priority.

Design insights from literature

Place is dynamic, and it's OK to experiment

When I first started thinking about designing infrastructure for UUVI, my thoughts went immediately to the park infrastructure I had seen and experienced before. Most notably, the designs employed by Parks Canada and by Metsähallitus, which manages Finnish national parks such as Nuuksio. In both Canadian and Finnish national parks very traditional constructions are used, often employing large raw round timbers and more traditional design elements such as gabled roofs (Metsähallitus design drawings are freely published on their website) (Metsähallitus 2015). This type of construction has benefits: it employs materials that might be collected on sight, and references vernacular architecture in order to fit into its environment through materiality and tradition. For these reasons, I was reluctant to introduce new and perhaps unexpected designs to UUVI parks. We have grown to expect a certain "national park aesthetic", and it fits into our expectations of what a park visit should be.

Through the readings of Cronon and Beery et al., and understanding nature and culture as connected, I came to understand my role as a designer within the parks system in a different light. Rather than intruding on a pristine wild space—where any interventions would be negative—I begun to see my work instead as additive. UUVI parks are already a cultural construct, where human visitation is encouraged and made accessible. Infrastructure acts as a point of interaction between the visitors of the parks and the non-human nature. Being creative about the activities that people conduct in parks is not only more interesting, but necessary. As society becomes more digital, people's behaviours and interests change, and parks may need to change to reflect this. Park visitors may be more likely to seek out experiences that can be easily shared on social media, for example. In Gros Morne National Park in Canada, the Red Chair campaign saw the installation of red Adirondack chairs in picturesque locations, with the corresponding hashtag #sharethechair. To date there are over 11,000 such tags on Instagram, although approximately half seem dedicated to individuals dispossessed of their

chairs by their dogs. Regardless, thousands of red chair photos have been posted, and the campaign was expanded to parks across Canada (*Fig. 1*) (Parks Canada 2013).

Seeing parks as a place where people and nature interact and become better as a result led me to feel more free in my design explorations. It was this train of thought that led me to some fairly unexpected ideas such as placing waterslides or gym equipment in the parks. More importantly, it gave me license to explore more contemporary design languages in the parks, and deviate from the log constructions we have become so accustomed to. It is okay for our perceptions of nature reserves to change, and it is exciting to experiment and explore new ways to understand park infrastructure in a way that develops the human relationship with nature.

While cultural bonds with nature can develop and change, this does not mean that history must be ignored. Understanding place as a cultural construct led me to dive deeper into the Finnish understanding of place, and investigate further into traditional Finnish vernacular architecture. Some Metsähallitus structures differ greatly from those used in Canadian parks, for example. This can be seen in the laavu or the kota, both of which Metsähallitus provide plans for (*Fig. 2*). Combining traditional forms with contemporary materials, for example, might maintain the connection to nature that Finns have been developing for millenia, while exploring new ways to manifest it. Conversely, new forms with traditional materials could also be explored.

Fig. 1. Parks Canada's #sharethechair campaign on Instagram (Parks Canada 2019)

Fig. 2. Laavu (Metsähallitus, P. Ikonen 2015)

Balancing the scenic and ecological aesthetic

As previously explored, landscapes that we consider scenic are not necessarily the most ecologically valuable. Design efforts can be made to change this. In the context of park infrastructure, it might be beneficial to explore ways in which to lure park visitors to ecologically rich landscapes. This could be done through creative placement of shelters and benches, for example, or by providing viewing platforms with interesting vantage points in locations that are otherwise less scenic.

In the case of UUVI's Kopparnäs-Störsvik park, there are areas along the shore line that are scenically stunning. Naturally visitors gravitate to these areas—but these are also the locations where all the shelters and stoves are located. Further from the shore and across the park's main access road lies an interpretive trail amidst some forested areas bordering some farmland. When I walked this trail in midsummer, it was already overgrown, clearly not enjoying the same level of traffic as the other areas of the park, despite providing fascinating information about the animals and plants that call the place home. More efforts could be made to combine infrastructure in ways that bring people closer to these less appreciated areas. Shelters and stoves could be brought to these lower traffic areas and act as starting points for interpretive trails, or could even include some interpretive elements directly on them. Shelters that are oriented towards scenic views could include secondary framed views to less obvious features: lichen on a rock, mossy ground, or a birds nest.

Fostering incidental nature experiences

Visitors to UUVI parks come for an intentional nature experience. These intentions vary from person to person and group to group. Some might be coming simply for a picnic, while other might come for a run or a bike ride, and yet others to forage for berries or to watch birds. As noted previously, during proactively nature-based activities such as berry picking, incidental nature experiences can still occur, such as hearing the rustling of a nearby bird or small animal.

I would argue that such incidental experiences are more likely to occur during outwardly focused activities, or activities where one's attention is already given to the surroundings—like bird-watching, foraging, or hiking. Examples of more inwardly focused activities might include grilling over the fire, running with headphones on, or mountain biking (where focus can be quite myopic on the trail in front of you).

Park visitors should of course be able to enjoy the park in whichever way that suits them best, but design elements can softly nudge people towards a more outward focus. Rather than housing one central stove or fire pit, for example, shelters can have the fire pit towards the outside, bringing people's gazes (which seem naturally magnetized by fire and food), at least to the direction of the outdoors. Trails can be dotted with viewpoints and benches that encourage a moment of rest and contemplation. Perhaps a more explicit example might see the provision of buckets and berry identification guides to encourage the foraging of berries when that may otherwise not have been planned (this might be especially helpful for foreigners unfamiliar with the practice). Directing the attention outwards not only encourages incidental nature experiences, but may be calming as well, as the attention restoration theory of the benefits of nature suggests that nature that engages us without requiring focused thought can be restorative.

Literature design insights summary

Concept	Design Insights	Potential outcomes
Nature is not defined by the absence of people; place can describe our interactions with the non-human world	Cultural legacy can be respected while still being experimental	Use of traditional vernaculars or materials can reference historical connections with nature Deviations from what is expected will contribute to the changing relationship we have with non-human nature
The ecological aesthetic attempts to ascribe beauty to thriving ecosystems	Ecologically valuable but less scenic landscapes can be made more palatable either by changing the landscape, or by changing the perception of the viewer	Boardwalks, interpretive trails, or viewing platforms can change the way we appreciate landscapes that are not necessarily scenic Shelters and amenities can be brought to ecologically valuable areas to increase people's exposure to them Shelters might frame secondary views towards unexpected and interesting aspects of the park, such as interesting vegetation or geological formations
Incidental nature experiences can enrich a park experience	Outwardly focused activities might promote incidental experiences	Shelters can draw the gaze outwards rather than inwards Rest areas and viewpoints on trails encourage contemplation and enjoyment of surroundings Providing information or tools to encourage activities like bird watching, foraging, or hiking

2. PROJECT

Design brief

The brief for this project was well defined. In light of aging park infrastructure and issues pertaining to accessibility, maintenance, or function, UUVI strove to redesign most of its park infrastructure. At the same time, the organisation hoped to have the infrastructure contribute to an updated brand image and meet the changing needs of park visitors. Stoves, benches, signposts, woodsheds and shelters would all be redesigned for thesis project. Park toilets, functioning well, would remain as they are. By designing multiple park elements at once, a unique opportunity existed to create a harmonious approach to each item, uniting materiality, form, and allowing for synergistic functions between elements. While the project was approached as a whole, each item has distinct functional requirements.

Structural Elements

Benches

The existing benches in UUVI parks consist of fire rings designed in the 1980s, also by students of Aalto University, then TAIK (*Fig.3*). While aesthetically appealing in their geometric nature, these benches pose practical problems for both UUVI and its guests. Each bench plank is of different dimensions to accommodate for the geometry, making repairs difficult for UUVI and often going neglected. The other problem associated with the current benches is their closed nature. As a mostly closed ring with only a small opening on one side, visitors often have to climb over the bench in order to sit on the inside towards the fire. This is a challenge for visitors with mobility difficulties and is an inaccessible design for these people. A bench redesign would solve these maintenance issues and follow Finnish accessibility guidelines, while being comfortable and functional.

Fig. 3. Existing bench and stove


Fig. 4. Kiosk grill

Stoves

Existing outdoor park stoves consist of a repurposed section of cement culvert with steel grills attached. This is a ubiquitous type of fire pit (as evidenced by my own experiences with them in Canada), but is not without issue. The cement often crumbles, and the aesthetic result is one easily associated with urban decay. One could surmise that this type of association could lead to disrespectful attitudes of visitors towards the park. As with the closed ring benches of UUVI parks, these culvert fire pits pose functional challenges as well. The firepit is large, and according to UUVI staff, encourages visitors to burn deadfall and trees collected from the park rather than the firewood provided, as a log can easily be propped up inside the firepit on the cement wall. The size of the firepit also prevents an efficient burn of firewood, a fact further exasperated by the absence of adjustable air vents. This leads to the burning of more firewood than necessary for cooking, and is a drain on UUVI resources. Lastly, there is no way to easily empty the fire pit of ashes, which can accumulate and block airflow.

The other type of stove in UUVI parks takes the form of indoor grills inside current grilling structures (*Fig. 4*). These can be convenient places to cook food during inclement weather, but seem to lead to a more rapid deterioration of structures, as burn marks and graffiti burnt into the walls of the structures are prevalent. The thin steel of the bowl also does little to hold the heat of the fire, leading to an inefficient burn here as well.

In order to address the drawbacks of the park stoves, UUVI's Field Manager Mikael Avellan had already set out upon designing a new one. His design addresses many of the above concerns: it is sized to fit the logs that UUVI procures from suppliers, has a removable ash drawer, an adjustable grilling surface, and burns efficiently and safely. My role would not be to redesign this stove but rather to refine Avellan's design and create drawings for it.

Shelters

The existing shelters at UUVI parks are prefabricated units made of thin profiled logs and commonly available at hardware stores in Finland. These units are very cost effective and provide effective shelter for guests. When paired with a grilling unit in the center, however, rapid deterioration of the structure often ensues, with people burning the walls of shelter either intentionally (in the form of graffiti) or not. The structures often make use of plexiglass windows which get scratched (again often in the form of graffiti), or deteriorate due to degradation from UV and smoke exposure. When these structures have three uninterrupted walls, however, the result is often a very dark and uninviting structure due to its depth and center-peaked roof (*Fig. 5*).

The requirements for new UUVI shelters were perhaps the most difficult to define. A more modern, inviting, and delightful experience could be achieved. Further insight into how to foster this experience would be gathered through interviews and observations of park visitors.

In addition to the experiential nature of the shelters, they must also be relatively easy to transport and construct. As many UUVI parks are islands accessible only by boat, individual components are required to be moveable by two people. Rapid construction methods are also preferable, to allow for lower project costs and easier project management. The shelter should also be robust and have a considerable lifespan.

This requirement for easy construction favours existing and tested construction methods and constituted a significant design constraint. In contrast to one-off pavilions or installations for architectural fairs or expos which employ new and innovative materials and methods, for example, a fresh and exciting experience should be achieved using methods which people are accustomed to seeing.

Woodsheds

UUVI does not currently have a consistent strategy for their woodsheds. Each is different, and made ad-hoc for each site. Mostly, they take the form of fairly small structures open on the front and capable

Fig. 5. Kiosk

Fig. 6. Two woodsheds

of holding stacks of wood only one or two columns deep (*Fig. 6*). This ad-hoc approach to wood storage causes Avellan to approach loading each shed in a different way. Often, the woodsheds are not robust enough to endure the constant wear and tear that they are subjected to.

To vastly improve the wood loading workflow, Avellan desired the woodsheds to be large (to require less frequent refills), and to have a roof that slides open (in order to allow loading by crane when possible). This last requirement presented a difficult design and engineering challenge.

Signposts

As with the woodshed, UUVI does not currently have a consistent solution for park signage. Signs are different at each park, and sometimes even within the same park. Recently the organization has been employing signage printed on an aluminum composite substrate. This type of printing is cost effective and durable, and allows for full colour digital prints.

Two configurations of signpost are required: one individual standing post with directional signs to point out landmarks or trails, and one larger sign in A0 format supported by a post on each side to display maps and more detailed park and trail information.

The signs would need to be installed either in soft ground or anchored into rock.

Existing structures summary

Benches

Advantages

Interesting design

Disadvantages

Difficult to maintain

Not accessible

Not applicable for trailside benches

Requirements for new design

Easy maintenance

Accessible

Stoves

Advantages

Low cost

Disadvantages

Does not age well

Fits fallen trees

Inefficient

Requirements for new design

Durable

Sized for supplied wood

Deep walls

Adjustable air flow

Shelters

Advantages

Low cost

Easy installation

Disadvantages

Uninspiring

Do not age well

Can be dark

Requirements for new design

Easy installation

Exciting design

Low cost

Woodsheds

Advantages

Small woodsheds have low visual impact

Disadvantages

Inconsistent

Not durable

Too small

Difficult to load

Requirements for new design

Durable

Large

Easy to load

Signs

Advantages

Aluminum printing is working well

Disadvantages

Inconsistent

Requirements for new design

One directional signpost

One A0 signboard

Supports printed aluminum sheets

For soft or hard ground

Balancing practicality and delight

As defined by UUVI, the project goals were mainly driven by practicality. There are many practical considerations for public park infrastructure. As a publicly funded institution, UUVI has a limited budget and needs to make the best of its resources. For this reason, infrastructure could be overly extravagant or complex in either material or construction. Each project needed to be designed for small scale manufacturing, using commonly available materials and methods. This requirement was a critical one, as it imposed the most restrictive design constraint.

Despite limiting design freedom, using existing methods and materials was important not only for reducing cost but also for ease of maintenance. As seen in the existing ring benches, designs with non-standard components can pose a problem for maintenance. Given the remote nature of many of UUVI's parks, robust constructions that are easily repaired with portable tools were preferable.

Practicality extends to park visitors as well, and the most important requirement for new park infrastructure is that it fulfills their needs. Stoves must cook, shelters must shelter, signs must direct, and benches must support. Park visitors want an enjoyable visit and a park's infrastructure enables that. Before considerations of form, it must be seen as an immutable requirement that designed elements fulfill their functional requirements.

Practicality, however, should not eclipse delight. By pairing infrastructure renewal with an overall brand renewal, UUVI is hoping to reignite interest in their parks. Park infrastructure must therefore be aesthetically pleasing and inviting.

Challenges

Scope

This project was a daunting one, including five different design elements. Furthermore, each element was to be designed with the intention of being produced. This meant that dimensioned drawings were necessary for each object, and all components specified down to the individual nuts and bolts. For this reason, some corners were cut. Very little time was spent in the workshop building models or testing prototypes.

In addition to producing multiple designs, each would need to suit a variety of use-cases. As each park is different, designs would not be able to be site-specific, which would introduce some challenges in terms of installation. Foundations would need to be considered for the woodshed and shelter that would suit most types of ground, and the benches and signposts would need to be installed in both soft ground and hard rock. In addition to suiting as many locations as possible, the designs would cater to many types of visitors as well.

Language

Not being able to communicate proficiently in Finnish would prove more of a challenge in this project than initially anticipated. I initially thought that language barriers would be a problem in design research, which was not the case—park visitors were in almost all cases fluent English speakers. When UUVI conducted their own user survey, Specialist Silva Sallamaa was kind enough to translate the results for me. Challenges arose, however, in finalizing the designs of the infrastructure. Each project had different hardware and material requirements which required countless hours of desk research—finding the right materials, assembly instructions for them, and part numbers. Material and component availability is of course unique to each country, and most websites and resources listing materials and their instructions are available in Finnish and Swedish only.

Design process

In a larger sense, designing new UUVI park infrastructure took a fairly linear process. A closer look at the process shows a far more convoluted picture. A relatively short design research phase took place over three months at the beginning of the project and took the form of the literature review and user observations and interviews. This research phase was followed by a concepting phase during which ideas were given form through rendered models and discussed amongst the UUVI team. The delivery phase saw was the longest and most challenging aspect of the project and saw the designs finalized and dimensioned drawings created for production. Throughout the entire process, continued consultation with the core UUVI team—and especially Field Manager Mikael Avellan—gave insight into practical considerations and the expectations of park visitors.

Design Research

Design research for this project consisted of user-centered research and a co-creative process with UUVI staff. User-research was supplemented by my own observations and experiences in UUVI parks. No formal process was taken here beyond thinking critically about my experiences and taking notes on the day of each visit.

User research for this project borrowed from concepts of contextual inquiry. Park visitors were observed using the parks, and were then interviewed about their experiences and behaviours. Observations were made over 10 separate days in the summer of 2017 in Kopparnäs-Störsvik park, and long-form interviews with 6 groups were conducted.

In addition to my own user-research, UUVI was simultaneously conducting their own survey and kindly shared their results with me. I spent several hours with Sallamaa who translated and discussed the results with me. With over 300 respondents, this provided a broader insight into park visitors' attitudes.

The UUVI team was also very involved during the design process, being responsible for the well-defined project brief, as well as guiding me throughout

design iterations and drawing upon their cumulative years of experience working in parks.

The insights from the design research would be combined with those gleaned from the literature review to inform the design concepts.

Design production

This project had a considerable production element. Five products, with variations within, needed to be designed and made ready for manufacturing. This meant that while research was critical, a larger focus had to be put on the actual production of the designs.

First, designs were concepted through sketches, written ideas, and low-fidelity 3D models. These concepts were discussed with the UUVI team as well as thesis supervisor Turkka Keinonen, before choosing a direction in which to move forward. While each independent project moved at its own schedule, overarching decisions were made to tie the projects together such as materiality, construction techniques, and how projects would interact.

Once concepts were finalized (or so we thought), I began the process of drafting them for production and construction. This became a far longer process than expected, as many revisions and back-and-forth exchanges between myself, the UUVI team, and the production facilities were required. These challenges brought to light the rigour and commitment required to bring a product to reality, even when employing small scale production techniques.

3. DESIGN RESEARCH

Contextual inquiry

In order to design infrastructure that meets the needs of park visitors, it was necessary to learn from these visitors. Contextual inquiry is a user research method that sees the researcher learning from and with users in the context in which an activity takes place (Courage, Baxter and Caine, 2015). For this project this meant interacting with park visitors in UUVI parks themselves: observing visitor activities, asking them about their experiences, and discussing their choices and behaviours to gain insights that could be used during the design process.

While visiting Kopparnäs-Störsvik, the location of the majority of my interactions with park visitors, it was clearly apparent that most of the people using park infrastructure did so in groups. I therefore decided to conduct interviews not with individuals but rather with groups of visitors. I conducted six in-depth interviews, each taking the form of an open-ended discussion lasting from 30 minutes to an hour. Topics discussed included their motivations for visiting, how they got to the

park, the activities they were pursuing, and their use and expectations of park services, but did not follow a predefined set of questions. While talking, I would also observe the groups and their interactions. These observations were sometimes as valuable as the discussions themselves. While interviewing a large multi-generational family of 16 people, for example, it was fascinating to see how they were using the park infrastructure to prepare a meal large enough to feed everyone.

From these, three different group identities emerged: the Multi-generational Family, the Outdoor Enthusiast Family, and the Friend Group. This practice was similar to the creation of personas, but took into account the needs of groups rather than the individual. While the decision to conduct interviews in groups was largely born out of necessity, it also constitutes a design insight in and of itself. For all of the designs, it would be necessary to consider the functionality not just for one user, but rather for many at once, and even multiple groups at once.

While visitors come most often in groups, it is of course true people also visit the park alone. To understand these users, I spent some moments talking with friends who visit parks on their own for hiking, mountain biking, and climbing trips. Based on these conversations, solo visitors are less demanding of park infrastructure and more adaptable to varying situations in the park, be they natural (such as getting caught in a rainstorm), or social (such as joining a party already using a firepit). These friends told me that they were often equipped to cook their own meals, and would almost always be well equipped for any weather conditions they might face. These conversations further validated the choice to focus on understanding group dynamics and needs.

Long beach at Störsvik

GROUP PERSONA

Outdoor Enthusiast Family

> *The idea is to feel that you're in the middle of nature, personally I don't like to have too much [built infrastructure]. We found already some strawberries and blueberries and mushrooms also.*

AT-A-GLANCE

GROUP SIZE 5

GROUP TYPE Family

AGES 3 children aged 5-15
Parents in late 30s

HOME Helsinki

NATURE EXPERIENCE | VACATION | CAMPING | INDEPENDENT

OBSERVATIONS

I talked to Santtu and Suvi, parents in their late 30s. They brought their 3 children, aged 5-15, for a three day camping trip, staying right near the beach within the trees. They were close to the open air stove - Mikael's first prototype, which they enjoyed (and wanted similar in their yard), but also had a stove of their own if it was being used.

They like having the convenience of dry wood and toilets, as it adds just enough comfort and structure to make camping more enjoyable. They also remarked that they like the brown colour of the toilet as it blends in.

GOALS

- Nature experience.
- They thought a table near the stove would be nice.
- Hiking, swimming, berry picking during their stay.
- This is their version of a cottage.
- Prefer to be further from the parking lot and the crowds.

NEEDS

- Toilet and stove are appreciated, but can be further from the car.

TRIP ATTRIBUTES

GROUP PERSONA

Multigenerational Family

Grill kiosk at the Störsvik parking lot

AT-A-GLANCE

GROUP SIZE	20
GROUP TYPE	Family
AGES	5 - 60s
HOME	Helsinki

GRILLING SPORTS SOCIAL CONVENIENCE

"We come because the kids love the beach.

OBSERVATIONS

Vivian and Myy talked to me about their family's gathering in Störsvik. A Vietnamese family, they drove in from Helsinki, and were camping for one night over the weekend. The group was big: 16 people with 4 more coming. Heaps of food covered the single picnic table. They had 4 tents, one of them very large. There were about 5 kids under the age of 10, a couple of teenagers, and 4-6 adults.

This was an extreme use case, and was by far the largest group I encountered. They overcame the difficulty of managing such a large group by staying close to the parking lot.

GOALS

- They come here because the kids love the beach.
- They like the table, and the flat ground for pitching tents.
- Enjoy being so close to the parking lot to grab items, etc.
- Enjoy games like football, volleyball, and badminton (they had a net set up).
- Prefer to be outside in the nice weather, but used the shelter for grilling because they had to.

NEEDS

- Ample grilling area and food storage surfaces.
- Enjoy games like football, volleyball, and badminton (they had a net set up)

TRIP ATTRIBUTES

Hilltop grilling kiosk in Kopparnäs

AT-A-GLANCE

GROUP SIZE One group of 4
One group of 5

GROUP TYPE Friends

AGES 30s to 40s

HOME Helsinki

SOCIAL EXPERIENCE | GRILLING | PRIVACY | NATURE EXPERIENCE

GROUP PERSONA

Friend Group

> *It's up to everyone to take care of the park. It's all about people.*

OBSERVATIONS

I spoke with two different groups of friends on two different evenings, each made up of people in their 30s or 40s. Both groups were enjoying a social experience by sharing food and drinks in a grillnig kiosk in Kopparnäs, and one group had brought a portable speaker to listen to music. Still, they mentioned coming for the sea views and the beauty of the place. Both groups mentioned that it was nice to have some privacy.

One group had come in just for the evening, and the other group was camping for the night. One of the campers had ridden her bike to the park, getting wet in the process. She was drying her clothes on a stick in front of the fire. In the same group, someone had hung a waterbottle from a nail in the wall.

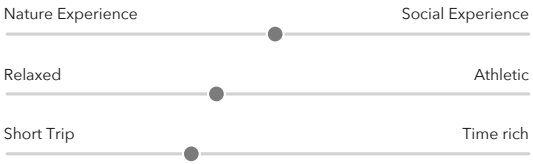
GOALS

- Sharing time outside in a social way
- Enjoying a simply cooked meal
- Staying dry and comfortable during the gathering

NEEDS

- A private place where it is OK to be a bit loud
- A way to dry clothes and a place to hang items

TRIP ATTRIBUTES



Contextual inquiry insights

Based on the interviews with the various groups and the insights gathered by the group personas, several important criteria for park infrastructure were identified:

Variability of location

All of the groups valued privacy and space. Sharing shelters was avoided if possible. This shows that spreading out smaller shelters would be preferable to building one large shelter. Having amenities in more locations has the added benefit of serving more types of groups as well. As I noted in the interviews, some groups like the Multigenerational family preferred to be near to the parking lot, and others, like the Outdoor Enthusiast Family, preferred to be further away—almost as far away as possible.

Functional spaces

The different groups brought to light just how much use the spaces get, with some grills being used to make dinner for over a dozen people! Everyone mentioned that having work surfaces was critical, but I also noticed other ways that people were using the shelters: often they would hang jackets, garbage bags, or other items from nails on the wall. It is unclear how these nails got there, but clear that they were useful. Benches are often used to prepare and slice food, and I also observed one person drying clothing near the fire using a stick collected nearby. With regards to the round sheet metal stoves in the grilling kiosks, groups mentioned that they lost heat too quickly, making them difficult to cook on.

Home away from home

For some visitors, it was clear that the parks provide an alternative to a summer cottage. Parks are a place that they can stay for days at a time and the infrastructure enables that. Without wood and stoves and toilets, these extended stays would be far more difficult. For these visitors a clean, inviting, and even premium experience is important.

Expectations of a shelter

Lastly, it was clear from the discussions that people

have clear expectations of what a shelter in the woods should be. Four different people mentioned that having at least one corner is important to block wind. Unanimously, people said that shelters should be made of wood. These preconceptions are derived from what people are accustomed to seeing in park settings.

As mentioned in the literature review, however, it is important to contribute to an evolving narrative of what nature is and what it means to be in nature. In a time of increasing environmental degradation, the reactionary response would be to keep parks as pristine and free of people as possible, with an aesthetic that follows (using unprocessed logs, for example). A case could be made for the opposite. Visual cues that remind visitors of their more familiar urban environments might help foment in their minds a continuum between the urban and the natural, and bring the reverence of nature that they enjoy in the parks into their daily routines.

Limitations

It is important to note that the research was in several ways limited. Firstly, all interviews were conducted in Kopparnäs-Störsvik park. This meant that users of UUVI's other 36 parks were not interviewed, and may have different needs and expectations (this might be especially true for visitors to island parks, who arrive by boat).

Even within the confines of Kopparnäs-Störsvik, a more diverse sampling of visitors would have been beneficial. Of the three group personas created, none were using the park primarily for athletic pursuits. In the groups interviewed, only one individual was also pursuing athletic activities, having ridden her bike from nearby Kirkkonumi. I did observe walkers and cyclists other than myself, and even spotted a pair of paddle boarders, but was unable to sit down with any of them for an interview.

The second limitation in the user studies has to do with seasonality and weather. All of the interviews were conducted in the span of one beautiful week in July. Only one interview was conducted in the rain. It would have been beneficial to conduct more research during inclement weather, especially as this is when shelters are most necessary. Similarly, winter park visitors were not interviewed due to the project schedule. I needed to rely on my own experience as well as the experiences and observations of the UUVI team to better understand the needs and requirements of visitors in rainy, windy, and winter weather.

UUVI-led survey

While performing the contextual inquiry, UUVI was simultaneously conducting its own survey of their park visitors in order to better serve them in the context of Kopparnäs-Störsvik park. The visitors were surveyed digitally through multiple choice and open-ended questions. Over 300 people responded to the survey, reached through UUVI's regular communication channels. Many were from the Kirkkonumi area, the closest municipality to the park in question. As such, these respondents represent a unique subsection of visitors that are more engaged than usual (as demonstrated by their having been reached out to) and have a more intimate knowledge of the area (given their proximity to the park).

From the results, it was clear that the respondents are dedicated to the park, and often feel protective of it. They are frequent visitors, and some lament the increased use of the parks. This is most often expressed as a frustration over barking or unleashed dogs, vandalism, garbage left by other visitors, and other groups being too loud. There was little consensus on park infrastructure: many respondents thought the parks were over-developed, while many

thought new infrastructure would help serve the increase in visitors (Sallamaa, S. 2017, personal communication, 9 August).

Survey insights

It is difficult to glean design insights from the survey data. There are many conflicting opinions, and without being able to probe the respondents further, it is impossible to ascertain the motivations behind their answers. However, there does seem to be consensus on two points: reducing crowds, and increasing the amount of care people take of the parks. With regards to the former, this could be seen as additional validation for installing smaller but more numerous shelters and grilling areas in order to thin out crowds. With regards to encouraging people to care more for the parks and the infrastructure, there might be several ways to do so. Explicit interventions might include signage that reminds people to throw out their trash and to leave sites as they found them, or to install more garbage bins. More implicitly, well maintained and pleasing structures might encourage people to take better care of them. When a structure is already degrading, with rotting walls or scratched windows, for example, people might be less inclined to care for it, or might feel compelled to give entropy a helping hand. This might be combated by employing rugged materials with finishes that make vandalism difficult, and by creating park furnishings with a premium feel. People are more likely to care for things that they enjoy and that they could envision owning in their own homes and lives.

Co-creation with UUVI staff

Along with learning from visitors to the parks, the UUVI staff were also an invaluable resource. With years of experience working for public parks between them, Tapio Leppikö, Silva Sallamaa, and Mikael Avellan each brought a different perspective which elevated the project and helped bring it to completion. Leppikö, the recently appointed Executive Director of UUVI, was especially interested in using new structures to elevate UUVI's brand image and recognition. He was especially helpful in questions of aesthetics, and wanted new infrastructure to have a contemporary feel. Avellan, UUVI's Field Manager, was especially interested in how functional and maintainable the projects would be. Quite understandable, as he would be the one to oversee the maintenance. Sallamaa, Specialist, took a middle-ground approach between her colleagues, and wanted to ensure that the infrastructure both looked good and functioned well. To this role as a "mediator", she added a strong interest in the accessibility of all the projects, and versed herself in the Finnish accessibility requirements, which she shared with me.

Co-creation insights

Practicality and functionality as primary drivers

While UUVI staff encouraged creative interventions that would entice visitors, it was clear that function must come first, both during use and in terms of maintenance and operations. Insights into the practicality of the designs would be peppered throughout the design process. At one point, for example, I posited using a rain chain instead of a traditional downspout for the shelters. Mikael quickly dismissed the idea, noting that children would quickly start climbing the chain and ultimately lead to the destruction of the gutter system. Some nods to practicality were baked into the brief itself—a woodshed that is easy to load, for example—while at other times the UUVI team would find impracticalities in my concepts and drawings upon review. I would also consult with the team throughout the process to gather their opinions (on materiality and finishes, for example).

Infrastructure should be able to be enjoyed by all visitors

In addition to practicality, the UUVI team is emphatic that their parks be accessible to and enjoyed by as many visitors as possible. For this reason, Sallamaa researched the Finnish regulations on accessibility requirements—a considerable help, as finding and understanding these requirements without understanding Finnish would be challenging. The results of her findings would be of particular use in the bench and shelter designs.

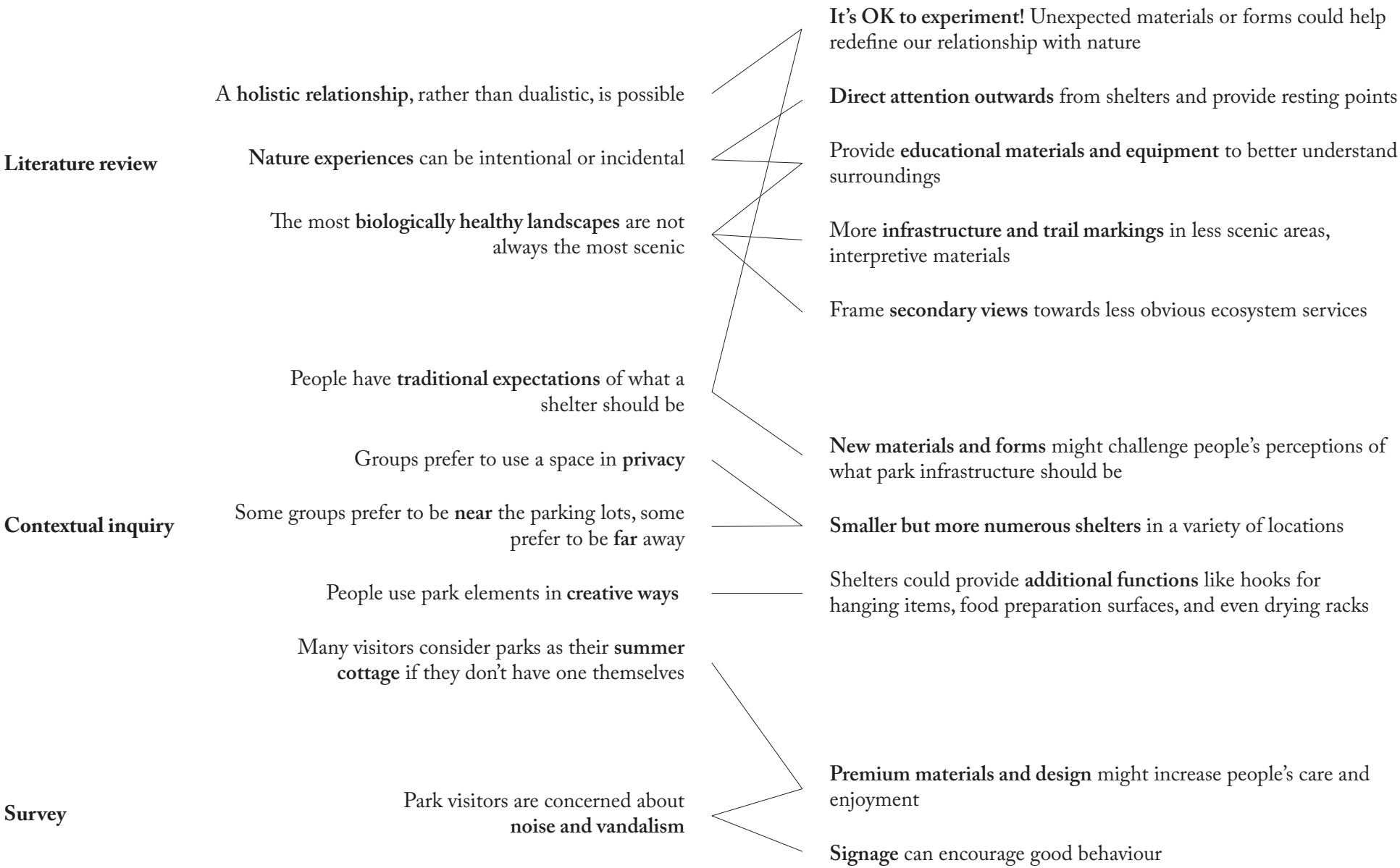
Missing opinions

While it was critically important to interview park visitors and UUVI staff, it is also important to consider the opinions of those that were missed. Specifically, people who might want to visit UUVI parks, but are unable to do so, either because they can't access the parks or because they don't know about them.

From the interviews I conducted, it was clear that awareness of UUVI parks is quite low. Some visitors thought that they were in fact in a national park and had never even heard of UUVI (called Uudenmaan Virkistysalueyhdistys at the time of the interviews). While a rebranding of the park association with a new name, logo, and website will hopefully help increase awareness, other mechanisms might also help. Online services that aggregate the different types of parks such as the Finnish Excursion Map, or Retkikartta, can help direct people to regional parks. Further collaborations could exist between the national and regional park systems to help redirect traffic from overused parks to less visited parks.

Strides could be made in terms of improving public transit access to certain parks as well. This might be especially true of Kopparnäs-Störsvik, a relatively short 15 minute drive from the Siuntio train station. A bus route from the train station to the park could provide a great alternative to Nuuksio and Sipoonkorpi national parks for Uusimaa residents without cars. This might be especially true as Kopparnäs-Störsvik, a seaside park, represents a very different geography than the aforementioned parks.

Summary—Observations and Insights



Co-creation with UUVI staff

Maintenance and **practicality** are a primary concern

Material choice should be based on **longevity and ease of cleaning/refinishing**

Structures should be **easy to maintain** and help improve UUVI operations

Equipment should be **accessible** to most visitors

Park elements should follow Finnish **accessibility guidelines**

Considering missing opinions

There is little **awareness of UUVI** —— **Improved synergies** between national and regional park systems

UUVI parks can be **difficult to access** —— Introduce **public transit** to parks where applicable

4. IDEATION AND CONCEPTING

After spending time with UUVI understanding the brief and their needs, and spending time in the parks observing and interviewing visitors, the next step was to turn the research insights into concepts, and finally construction drawings from which physical infrastructure could be produced.

This design production process was, like the project as a whole, not a linear one. Many of the five project elements were progressing at a different pace, and would be in different phases of completion simultaneously. The stove being an iteration upon Avellan's original design, for example, quickly progressed to final drawings—before concepting on the shelter had even begun.

The individual projects did, however, follow a similar trajectory. From research insights, I began to ideate what the different elements could be and how they might perform. This took the form of very simple sketches and written concepts. I then ventured to turn these ideas into more substantial visual representations. This was done by directly moving to 3D models, produced in Rhinoceros 3D (colloquially known as Rhino). This helped to explore ideas and to create easily understood visuals, but also served as a crutch to bypass sketching, which has always been a personal weakness.

Once several shelter concepts had been modelled and rendered, I met with the UUVI team and thesis supervisor Turkka Keinonen to discuss which concepts to explore further. The other project elements underwent a similar, albeit less formal, process, with initial concept renders being discussed via email before proceeding to creating drawings.

Concepts

To separate ideation from research is somewhat disingenuous. The reality was that while researching and thinking about the project, I was also thinking of possible solutions. Uncommon is the designer who does not start sketching in their mind the moment they read a brief (or even its title). This was certainly the case here, and even before starting any reading or field study, I was dreaming up possibilities. Sometimes, insights from the research would lead to new ideas, but they often also affirmed or invalidated previously held beliefs.

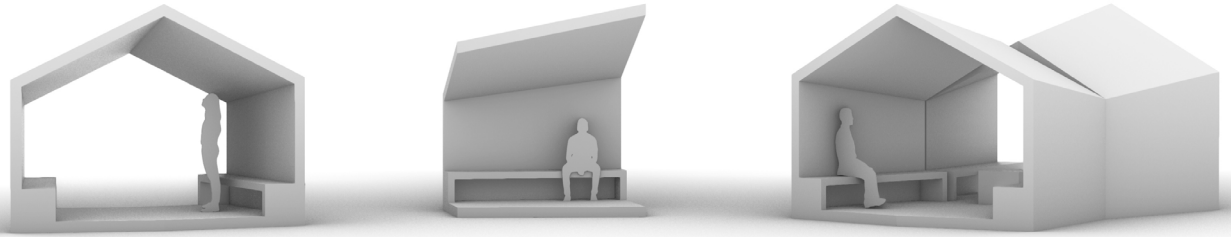
Similarly, ideation and concepting was also often carried out simultaneously. Concepting, which in this project will describe the visual representation of ideas, began very early in the design process, even before research had been completed. This largely took the form of simple 3D models, often made up of elementary volumes with little to no details worked out, in order to play with different scales and arrangements for the shelters and other elements.

While ideating, the shelter and the grilling site in general commanded the most focus. The other projects are quite functional, and the shelters and arrangement afforded the most conceptual flexibility. In addition, as the largest element, the shelter could set a design language that the smaller elements could follow in order to achieve consistency.

Following are the higher level themes into which sketches and ideas fell.

Modular shelter

Based on the group interviews and observations conducted in Kopparnäs-Störsvik, it was clear that groups were very different and had different expectations of the grilling areas. For this reason, being able to provide a more flexible type of structure would be beneficial. One way to achieve this would be to employ a shelter built of one or several modules. Modules could be added to create a large shelter in high-traffic areas, while fewer modules would use less resources in low-traffic areas.

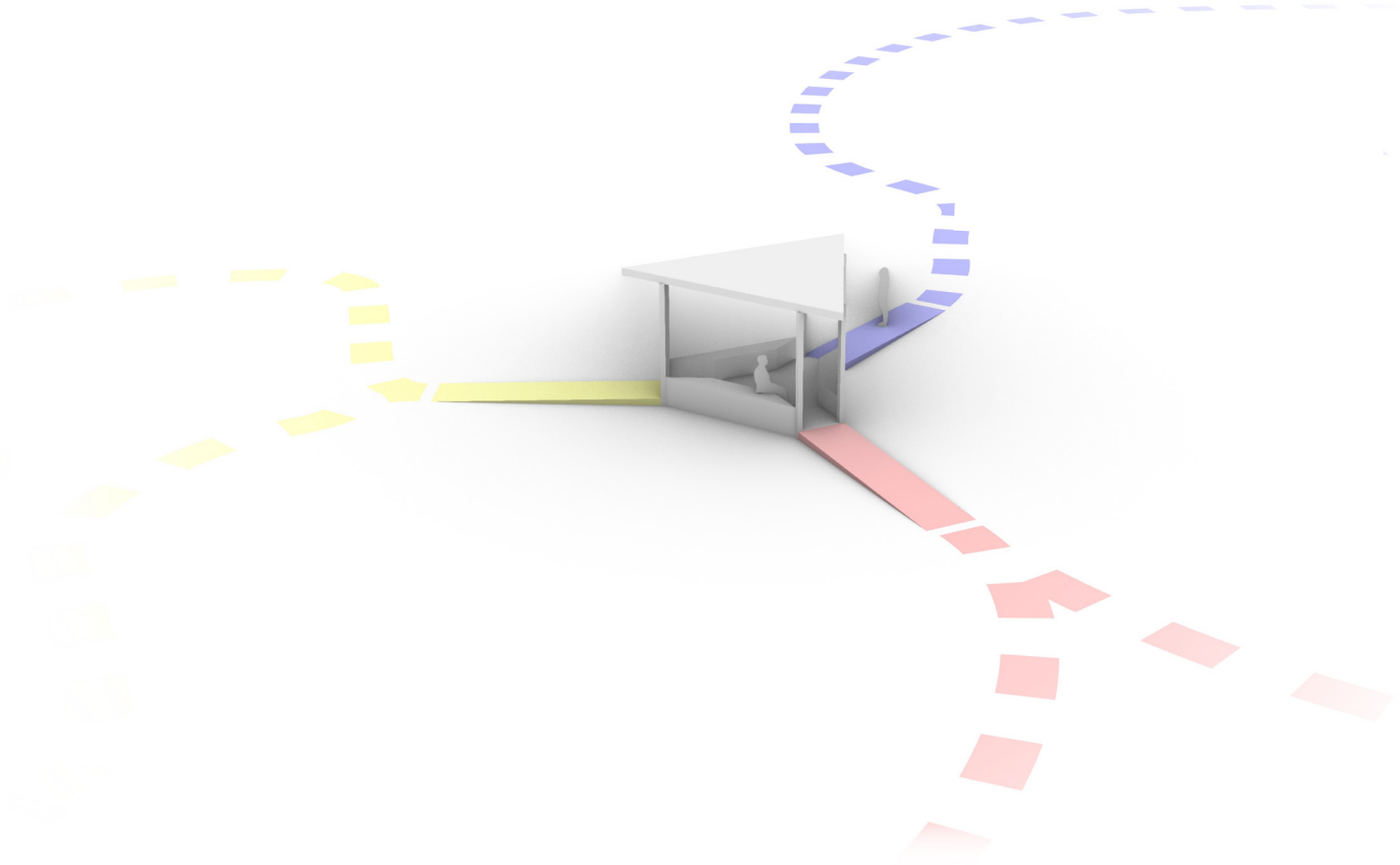


Pods

The Pod idea would see the use of very small, intimate shelters. This was based on the observation that while some large groups did come to the parks, most were in fact very small. A small and enclosed pod type of structure might provide a high level of privacy and a unique park experience. In order to accommodate larger groups, multiple pods could be placed in close proximity to each other in high-traffic areas.

From maps to reality

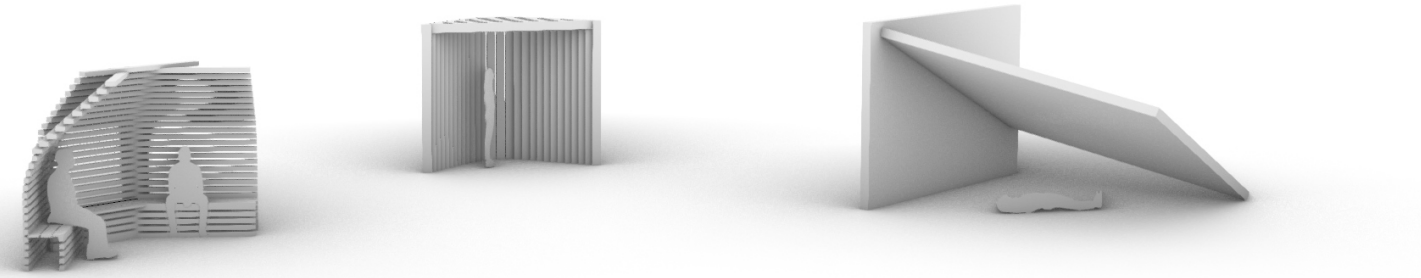
After observing and talking to the different groups, it was clear that for many, grilling food is the main activity. While this is a great way to enjoy the parks, deeper nature experiences can be had by venturing beyond the grilling areas. In order to draw visitors from the shelters to trails, it would be interesting to mirror the visual representation of trails on a map in the physical world. This might look like coloured walkways that correspond to the coloured trails on a map. These walkways could stem from a shelter in different directions, encouraging the exploration of the trails. Trail intersections could include similar walkways to make navigation extremely simple and intuitive. Shelters and benches could feature the same colours as the trails they are on.



Modern laavu

Based on findings from the literature review as well as observing the shelters in use, a more outwardly focused shelter might provide a more fulfilling experience than the current 3x3m square kiosks. The central stove magnetically draw people's attention. Paired with the darkness of these kiosks, the result is that the focus is usually drawn inwards.

The irony of this situation is that Finnish vernacular architecture has a rich tradition of shelters that look outwards. The traditional laavu is open on one side, and occupants face outwards towards a fire. This layout likely arose out of its simplicity and practicality (there is no need for a chimney, for example), but the result is also a shelter that promotes a closer connection with nature. While the laavu is most often constructed using traditional techniques and materials, it would be interesting to explore applying contemporary materials, techniques, and design to the form.



Choosing directions

Fig. 7. Expanding frame concept

After modelling promising concepts in more detail, they were rendered in Keyshot over background photos from UUVI parks. The results were discussed with the UUVI team and thesis supervisor Keinonen (*Figs. 7 and 8*).

It was decided to move forward with the expanding frame concept (*Fig. 7*). This shelter would frame views to the outside, even from afar. To combat wind, sliding screens could partially or fully form a back wall. When fully open, they would be hidden behind a stove chimney enclosed in stone baskets, a cheap but beautiful material treatment that could be procured on site.

The other project elements required less of a formal selection process. The stove direction had already been set by Avellan. The woodshed had major practical design drivers making concepting unnecessary. Signpost and bench concepts were sent and discussed via email before proceeding to final drawings.

Fig. 8. Other concepts discussed. Clockwise from top left: A-frame pod; Pavilion with wind screen; Pentagonal pods; Pill shaped frame; Modular shelters installed over water; Slatted laavu.

5. DESIGN PRODUCTION

After choosing directions for each project element, the focus turned to making working drawings from which structures could be built. In order to more accurately make construction drawings, each project element was modelled in detail in Rhino. This process was more demanding than initially anticipated, and far more challenging than the low-fidelity concept models. Countless hours were spent researching different hardware options, reading construction guidelines for different construction systems, and learning about the limitations and possibilities of different materials.

This design process was not linear, and often concepts would need to be altered or even abandoned altogether. Such was the case for the shelter, which would have been difficult to construct, and too exposed to the wind. Each project needed to be iterated upon after the first round of dimensioned drawings were complete. Here, a great deal of gratitude is owed to the UUVI team for their attention to detail in assessing the drawings—fresh eyes were invaluable.

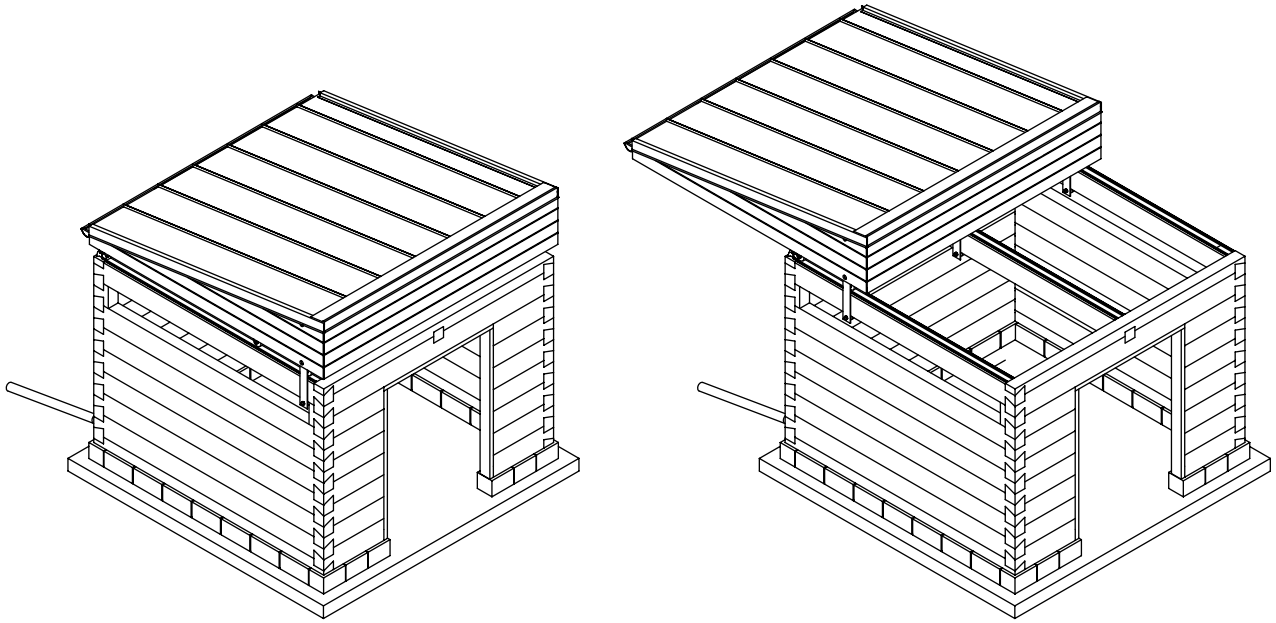
After many back-and-forths, final drawings were completed and passed along to fabricators, who are currently overseeing the physical production of the designs.

Final dimensioned drawings can be found in the appendix.

Woodshed

Dimensions: 3150 x 3150 mm

Materials: Cement foundation, profiled log body, corten steel mechanism, industrial casters, steel roof



Sliding roof

From the beginning of our discussions, it was clear that Avellan, as UUVI's Field Manager, wanted the woodshed to be as large as possible within regulations (10m^2), and to have a sliding roof. This was in order to minimize the effort involved in replenishing the wood stocks. A larger woodshed would require refilling less often, and the sliding roof would allow for refilling from above with the use of a crane. These practical features quite strictly set the form of the shed, and the task at hand became to engineer an elegant solution.

Designing a mechanism for the sliding roof involved some considerable research and careful consideration. It was tempting to make use of support frames to support the roof as it opened. Avellan had more ambitious goals in mind, and rightly thought that such supports would be an eyesore and that a cantilevered sliding roof would be preferable. I agreed, although was wary of the challenges that this would pose. The weight of the roof hanging over the structure would introduce a

lot of tension in the structure that would need to be accounted for all the way down to the foundations. Introducing moving parts to any object increases its complexity; I had never done so in something as large as a building.

From a cursory search for existing examples of sheds with sliding roofs, cantilevered designs are uncommon. Most often, sheds with unsupported sliding roofs split the roof down the middle, with each half sliding to opposite sides of the structure. This design is especially common amongst hobby astronomers, who seek the convenience of keeping their large telescopes in a shed, but need the roof to retract in order to see the stars. The benefits of a split roof are that the footprint of the shed while open is smaller, and the forces exerted by the overhanging sections of roof are smaller. Complications are also introduced, however, in that a seam is created directly of the middle of the shed, and measures must be taken to ensure weather tightness when the roof is closed.

Because building footprint is not a large concern in the case of the UUVI woodshed, and to reduce complexity, I instead opted for a one piece roof. I found very few examples of such structures, and only one that included enough detail from which to glean valuable information. A wooden shed in Norway created by architecture studio Rever & Drage matched our ambitions. The roof of the project, entitled Hustadvika Tools, rests upon casters that slide on tracks on the walls of the shed as well as on three interior joists. Casters also run along the bottoms of these joists preventing the roof from tipping backwards when open (*Fig. 9*).

Fig. 9. Hustadvika Tools by Rever & Drage (Rever & Drage, 2019)

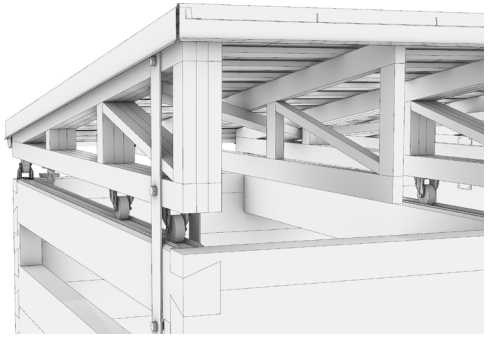


Fig. 10. Woodshed without cladding, showing mechanism

Woodshed construction

Using Hustadvika Tools as inspiration, I began to design a similar shed with a few notable differences. The Rever & Drage shed relies on three internal cross beams to relieve the tension of the roof when open, preventing it from tipping. As the UUVI woodshed would require openings of approximately 1.5 meters wide to fit the wood bags, only one internal beam could be used. This required moving the roof retention mechanisms to the outside walls.

Rever & Drage also relied heavily on wood construction to the extent of introducing unnecessary complexity. Their roof trusses employ complex joinery techniques, for example, and while the result is quite beautiful, such complicated construction would not lend itself well to repeatability. For this reason I would rely on tried and tested construction techniques, although combined in a novel way. Profiled logs make up the main structure of the woodshed, traditional timber trusses are used for the roof, and a steel roof keeps the weight low.

The use of profiled logs for the main structure proved to have many benefits. By using a relatively large log width of approximately 135mm (different manufacturers have slight variances in their log profile dimensions), a very sturdy base is provided to support the roof. Large logs also provide a wide section upon which the roof can slide. By omitting a section of log on the side walls, a gap is introduced in which the roof retention mechanism slides. The strength of the large logs allow them to quite easily support the cantilevered roof, and the profile of the logs provide a pre-shaped trough in which the casters can roll (*Fig. 10*).

The roof is assembled of traditional 42mm wood trusses, using a standard 1:7 roof pitch. The shallow roof pitch was chosen to keep the roof as small and light as possible: lower pitched roofs simply use less material. Of course, snow buildup can be more substantial on a shallower roof, so snow should be removed before sliding open the roof. In order to provide more strength where casters are attached, 48mm lumber is added to the 42mm trusses where necessary.

A steel roof is used for its longevity and low weight. I opted for a Ruukki system as it is the most ubiquitous system in Finland with the most available technical documents, and Avellan has built with it before.

For the retention mechanism holding the upward facing casters, steel was the obvious choice for its cost, strength, and ease of manufacturing. The plates can be fabricated in the same facilities that make the benches and signposts.

Iterations

While the formula above was reached fairly quickly in the design process, the woodshed went through multiple iterations. It took some testing of the 3D models to discern whether traditional or modern log corners would better suit the woodshed's roof mechanism. Traditional corners see the logs interlock in a staggered way, whereas on modern corners the logs meet flush with each other, connected by a dovetail in the miter (*Fig. 11*). Traditional corners were employed so that the crossbeam could simply be interlocked in the transverse wall beams above and below it.

The most challenging aspect of the woodshed was naturally the sliding mechanism. Countless decisions had to be made: the hardware, how to attach it, how to ensure all the components line up consistently, etc. For simplicity, all the hardware was chosen from one provider, ETRA. This limited the selection available, but also prevented what may have been many fruitless chases for the "perfect" hardware. In this instance, it was better to work with what was available, and make it work. Still, hours were spent choosing the right pieces to use and how to place them.

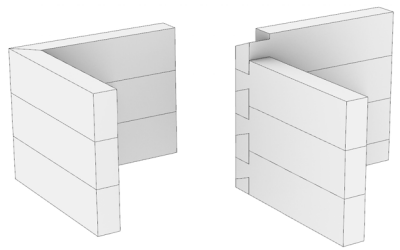


Fig. 11. Profiled log corners. Modern (left), and traditional (right)

Designing the woodshed: overview

Co-creative method

The concept of a woodshed with a sliding roof was devised by Mikael Avellan. He would later have influential input during the design revisions

Project goals

Easy to load wood

As large as allowable so that wood would have to be reloaded less often

Affordable construction

Should keep wood dry

Design solutions

Sliding roof was designed with standard components (traditional steel roof, traditional trusses, and standard industrial casters), in order to be easy to make and repair

Woodshed was designed to be just under 10 square meters—the maximum allowable structure without a permit

Main structure made of logs for durability and ease of construction

Cement platform keeps wood dry, and supports the weight of the wood. Air vent in foundation allow for air circulation

Main iterations

The woodshed underwent one large design iteration. After seeing the first plans for the sliding mechanism, Mikael had some ideas to simplify it

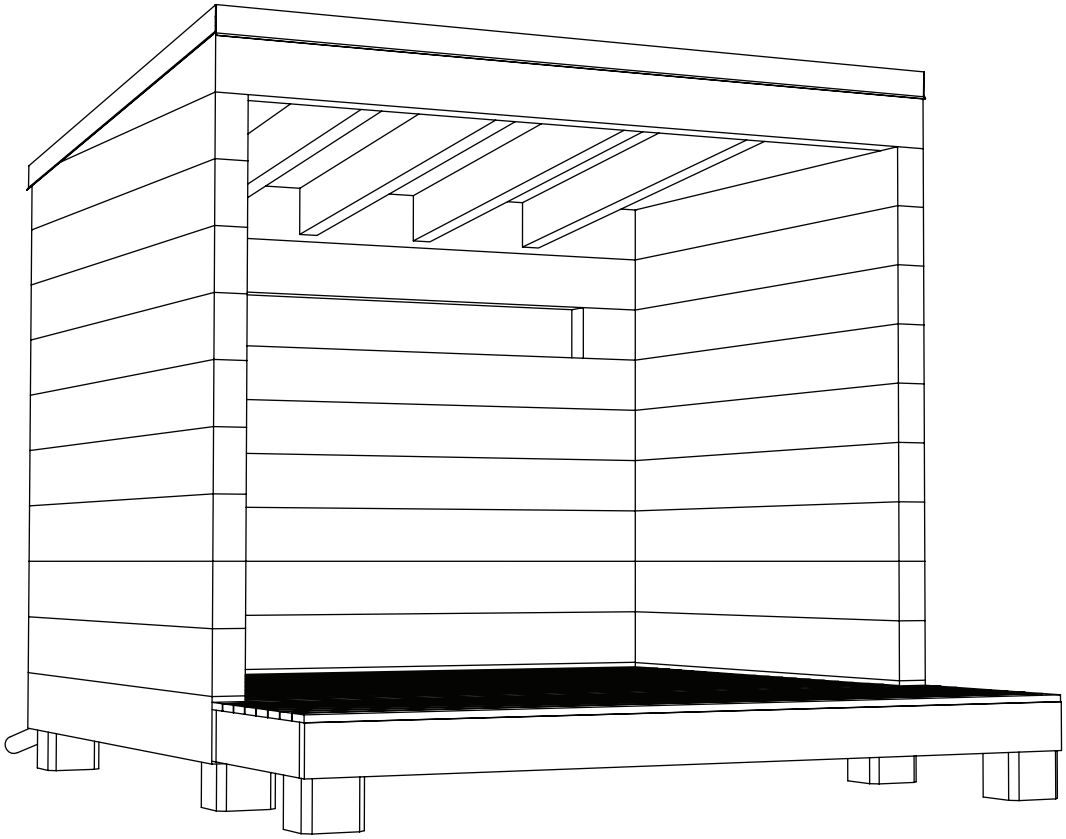
Main caster assembly was redesigned to require no bending or welding of the steel plates

Locking mechanism added to prevent unauthorised opening of the shed

Shelter

Dimensions: 3000 x 2500 mm

Materials: Wood platform, profiled log body



The open frame shelter

Having decided upon the open frame concept (*Fig. 12*), there remained concerns about the wind protection this design would offer and whether sliding wind screens could be made in a way that was affordable, durable, and user friendly (and if people would even use them at all). The benefits of the design—a visually compelling shelter that might create a novel experience for guests— were deemed to outweigh the costs. But other challenges also existed: I was uncertain how to produce the shelter.

Fig. 12. Open frame concept with sliding screens.

Two main challenges existed. The first was the unconventional angles of the walls. The second was the lack of front and back walls. The walls were angled outwards to create a feeling of expansion and further direct the gaze and attention outwards. Benches along these walls would also face slightly outwards rather than directly at the opposite wall. This would make construction more difficult than if the structure were rectilinear, no matter the method. The second challenge was of greater concern: without back and front walls, the shelter would be highly susceptible to shear forces. To overcome this, the joints between the two outer walls and the floor and ceiling plates would need to be much stronger than in a conventional structure.

In order to learn more about constructing the shelter, I turned to Aalto Department of Architecture professor (and engineer) Hannu Hirsi. We discussed the benefits and drawbacks of using either traditional wood framing or cross-laminated timber (CLT) panels. CLT panels would have the benefits of being pre-fabricated off-site, and creating an overall more simple and light structure. The CLT panels would need to be quite massive to build the shelter at the intended size of 3.5x4m, and would need to be split into sections before being re-connected on site. Because the CLT panels for this structure would be relatively thin (approximately 15cm in section), to counteract the shear forces extra attention would have to be paid at the moment joints between the wall and roof panels. I proposed reinforcing the these connections with steel plates that would slot into the corners, mimicking a technique I had seen on small handcrafted Japanese wooden boxes, but on a much larger scale. Some initial explorations of the shelter constructions are shown (*Fig. 13*).

Before I could finalize construction of the shelter, however, the UUVI team was growing increasingly concerned about the wind protection that the open concept would provide, and decided that a more enclosed shelter would be preferable.

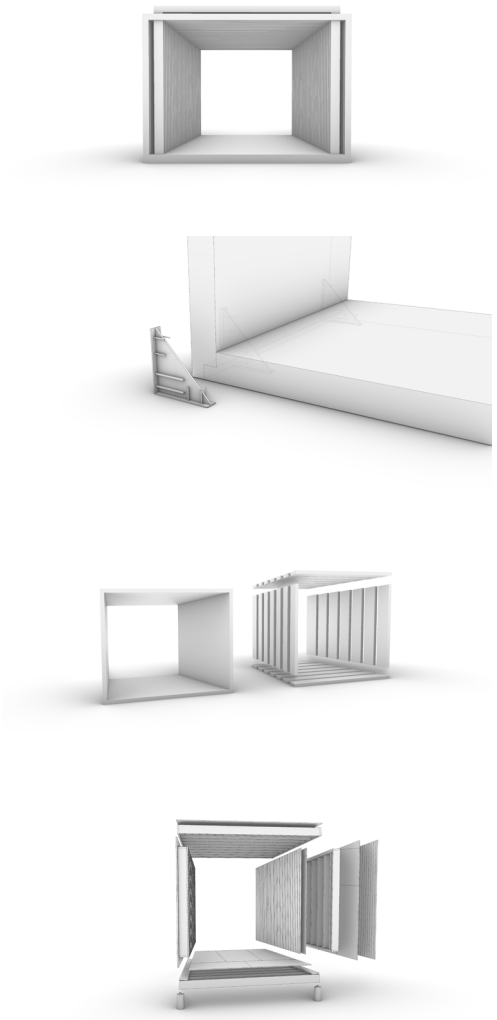


Fig. 13. Construction methods explored for the open frame concept.

Fig. 14. MUJI hut (MUJI 2017)

A new shelter direction

For many reasons, changing tack on the shelter was the right decision. Not only was construction challenging, the shelter would likely provide insufficient wind protection. More importantly, out of the proposed concepts, the open frame aligned the least with the design research findings, which suggested that smaller but more numerous shelters would be more successful. Taking into account all the research findings, the new shelter should then be small, accessible, outwardly focused, and made of long-lasting and premium materials.

Very quickly, I began to consider the use of profiled logs for a new shelter design for several reasons. Profiled logs were already proving to be well suited for the woodshed for the elegant way in which the sliding roof mechanism could interface with the logs. Additionally, after the difficulties in finalizing a construction method for the previous shelter, the simplicity of designing around an established pre-fabrication method was enticing. This simplicity would not be limited to the design process, either, as UUVI would enjoy the cost savings and ease of construction that such a system provides. This penchant was cemented after a visit to the Helsinki Spring Expo (Kevät Messut). Here, conversations with different log manufacturers and builders convinced me of the benefits of using such a system, and built examples served as inspiration for what the final result could be.

In designing the new shelter I was also heavily influenced (although at first unintentionally) by MUJI's pre-fabricated "Hut" (*Fig. 14*). This is a shelter that I had seen at the Habitare design fair and paid little mind to. I didn't think that it fit closely with the project goals, being an enclosed cabin meant for summer living. However, the simplicity of form and material must have stuck with me, because early drawings bore an uncanny resemblance to the MUJI Hut. The UUVI team and I had already been discussing dark surface treatments, whether through charring or stain, for their resistance to graffiti. A single-pitched roof seemed the most sensible way to cover a small shelter, and would match the roofline of

the woodshed, for which a single-pitched roof was chosen for practical purposes. The finish and roofline further cemented the similarities to the MUJI Hut.

With the intention of creating a small shelter, choosing quantity over size, dimensions were largely dictated by accessibility guidelines, as a radius of 1.5m is required to turn around a wheelchair. Accounting for bench depths, this led to a shelter with interior dimensions of 3 by 2.5m. These dimensions were further tested by stretching bright cord between tent pegs driven into the ground. This size is notably not much smaller than the 3x3m kiosks currently employed by the parks. As these kiosks could feel a bit dark, it was important then to allow a lot of light into the shelter. This was achieved by adopting the traditional form of the Finnish laavu. Similar to a lean-to, the vernacular laavu has an open front and a forward-facing roof pitch, which allows in a large amount of light. An additional opening in the rear wall allows in additional light and also frames a secondary view, which might expand people's appreciation of the surrounding environment, as was suggested by the literature review. Even with these openings, light penetration is a concern, and if initial prototypes prove too dark the interior surface finish can be changed from charred wood to a clear lacquer.

Based on these decisions of dimensions, materials, form, and finish, renderings were created that could be discussed with UUVI, who were pleased with the result. Simple drawings and specs would serve as guidelines that a log company could use in the creation of a new shelter. In order to accept proposals from as many log provided as possible, drawings were provided for both traditional corners (which all log companies can create) as well as modern corners (which require newer technology). It was also unclear whether corner profiles would have a significant effect on cost. After receiving proposals, some companies were able to provide the shelters with modern corners with a negligible effect on cost, and so these were chosen for their better weathering properties, for modern corners have no exposed end grain as on traditional corners.

A steel roof was chosen to match that of the woodshed. To continue the simplicity of the structure, large exposed rafters would hang on hidden hardware.

Designing the shelter: overview

Co-creative method

The shelter had the most input from the entire UUVI team

Many iterations were explored and discussed before deciding on a final direction

Project goals

Shelters first and foremost need to do just that: provide shelter from wind and rain

Should provide for the needs of different types and sizes of groups

Should be durable and require little maintenance

Shelter should enable a better park experience

Design solutions

Small shelters mean that more can be installed, allowing for more areas to be served, and more groups to use the shelters

Log construction for durability and ease of construction

Open front laavu-style shelter allows people to focus on the environment while remaining respectful of cultural traditions

Thick logs and premium finished connote quality, providing a better experience while hopefully encouraging respectful use of the shelters

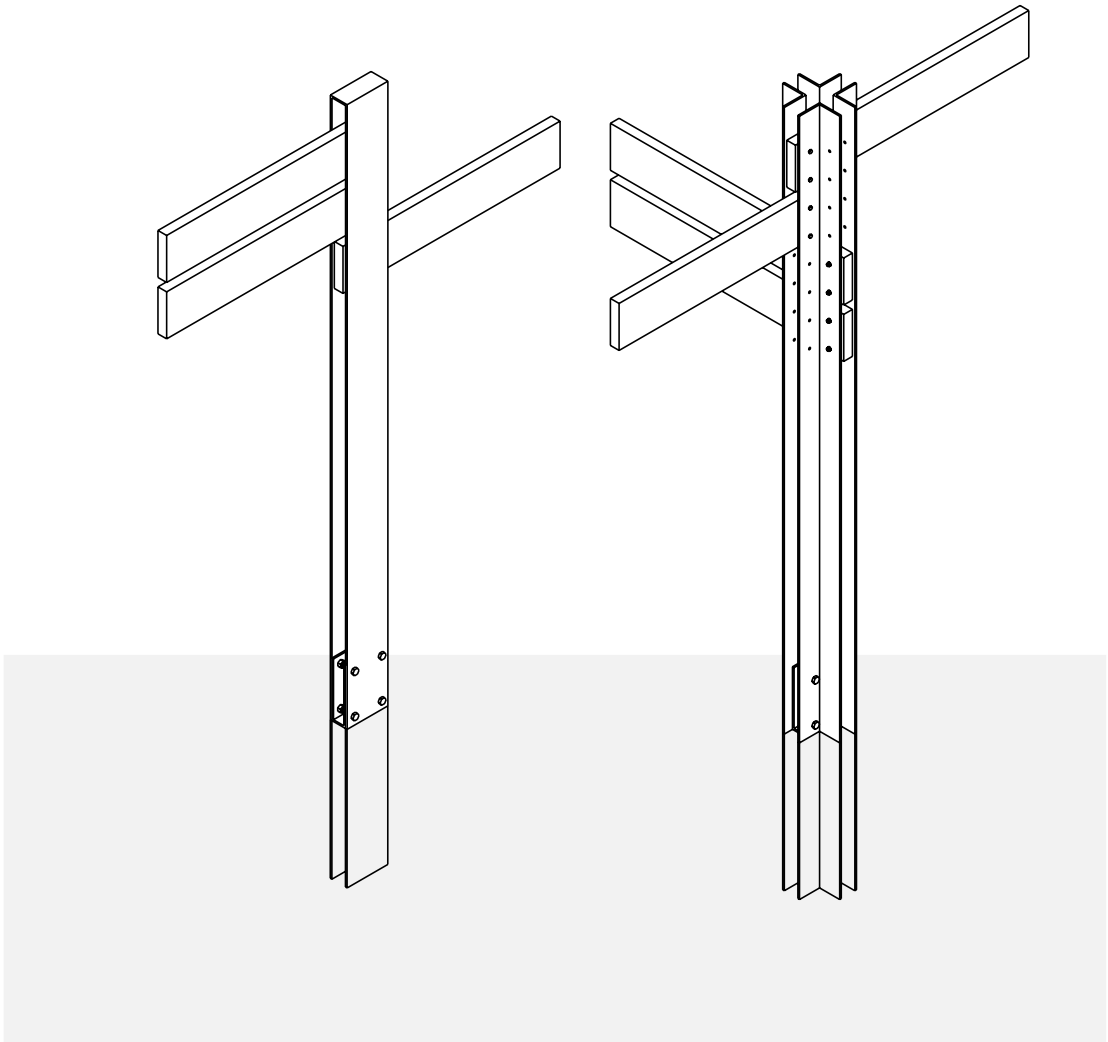
Main iterations

First design, open frame with a sliding wall, would prove to be too complex to build and possibly not the best solution either

Further iterations would include many different construction methods before settling on tried-and-tested logs

Signposts

Dimensions: 2000 x 150-210 mm posts, 150 x 800-1500 mm signboards
Materials: corten steel, larch



Different forms for the signpost were explored with the use of corten steel and larch. As the single signpost would have to allow for directional signboards, it was more complex than the A0 sign. Undoubtedly the simplest way to have a directional sign post is to use a round post with plates attached by clamping collars. This provides unlimited directionality, and is remarkably simple. With the rest of the elements being quite rectilinear, however, it would be somewhat incongruous to introduce a round post. Later it would also become known that corten steel tubes are not commonly available in Finland. So, I started to explore segmented posts, where a signplate would be attached to an internal axis, and extend through gaps between post segments. I initially explored these designs in both wood and corten steel (*Fig. 15*). Corten steel seemed the most viable option in terms of strength and ease of manufacture, and an initial design was sent to UUVI to be sent to potential manufacturers (*Fig. 16*). However, after learning that square tubing in corten steel was not available, an updated design was created using profiles created from bent corten sheets (*Fig. 17*).

This signpost was able to be fabricated, but would be prohibitively expensive—the design was overly complex and required too many parts to be cut and welded, and significant amounts of corten steel. So, a third and final design was created using more simple profiles with a single bend, larch signplates instead of corten steel, and eschewing the internal signplate axis by attaching the signplates directly to the angled profiles.

With the multi-directional signpost design having reached completion, a more simple bi-directional signpost was designed to be more affordable when less adaptability is required. The A0 signplate would be created by connecting longer larch boards between two of these signposts. An anchoring mechanism was also required for placing the post in the ground. The posts are designed to extend 50cm into the ground to be stabilized with cement or tamped earth. For anchoring into rock, the bottom 50cm can be cut off, and an anchoring plate is used. This plate is bolted to the bottom of the signpost and has a 30cm section of steel rod that can be glued into a hole drilled into rock.

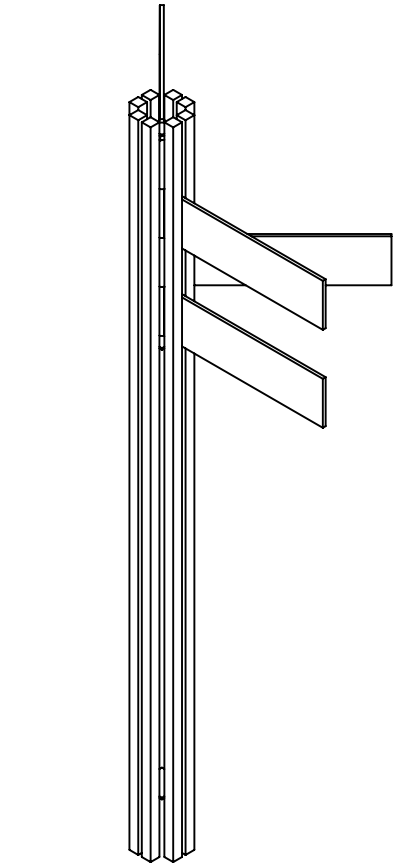


Fig. 16. Signpost with square tubing

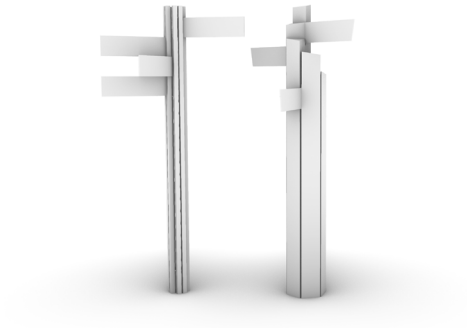


Fig. 15. Signpost concepts for steel (left), and wood(right)

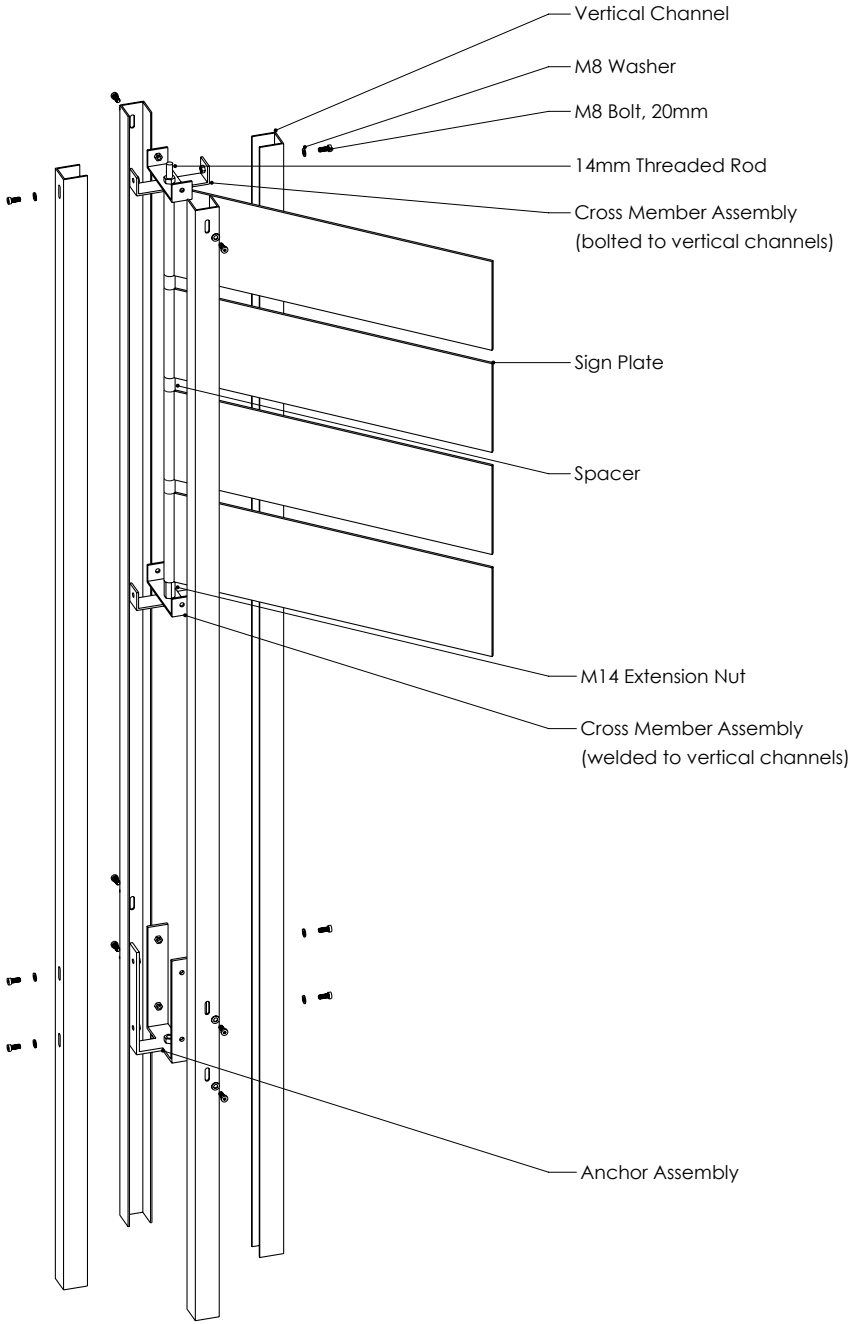


Fig. 17. Signpost with bent profile posts and an internal axis

Designing the signposts: overview

Co-creative method

Design goals were defined by Silva Sallamaa

Project goals

Signs should allow for changing trails, and for different types of intersections and trail marking needs

A commonly used element, the signposts needed to be affordable

Signpost should be able to be anchored in either soft ground or hard rock

Signage should be legible from far

Design solutions

Signs are removable, and can be pointed in four directions

Designed to be used with printed sign plates, allowing signs to be changed easily as needs change

Simple components are used

The same materials are used as in the bench for visual harmony, and so that the same manufacturer can be used for both structures

Signpost is designed long, to be buried underground with concrete in soft ground, or can be cut short, and bolted to an anchor the is drilled into rock

Large sign plates and tall posts allow for easy legibility

Main iterations

First iteration allowed for plates to be oriented in 8 different directions, but was design was too expensive to produce

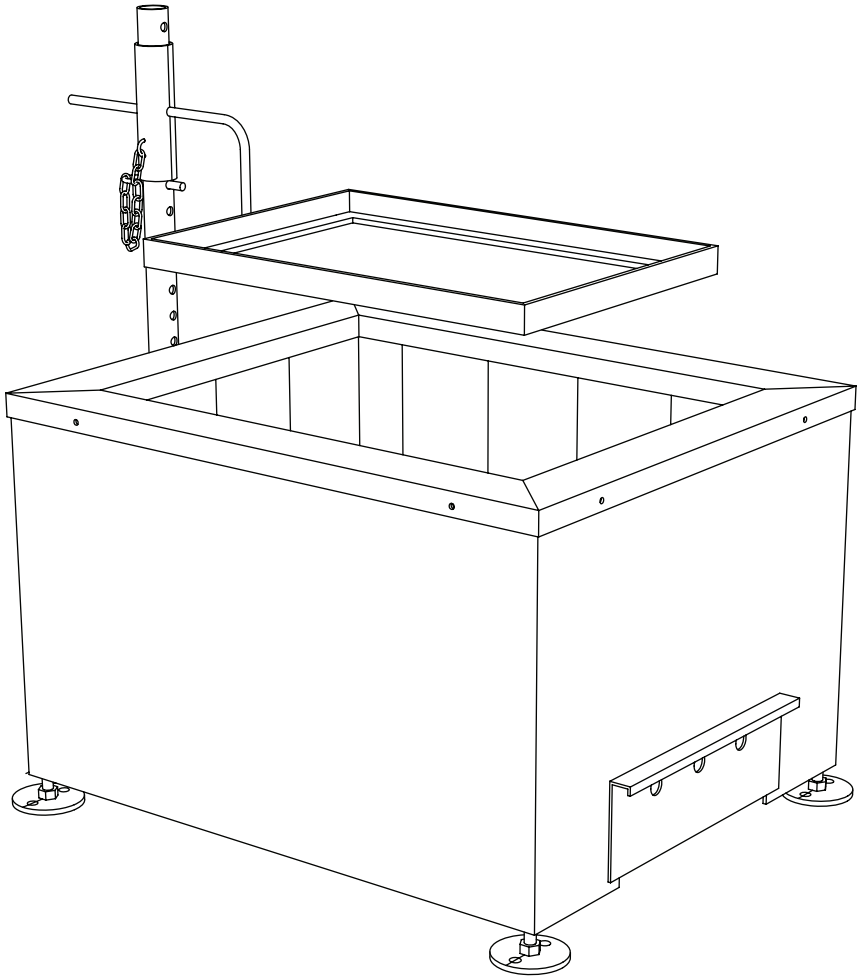
First revision saw the square tubes replaced with four bent U-channels, limiting the signpost to four directions

Final revision replaced the U-shaped profiles with 90-degree angle profiles. Central axis mechanism was omitted, requiring fewer and simpler parts and less welds. Design cues were also taken from the bench and tables, creating a more cohesive project as a whole

Stove

Photo credit: UUVI

Dimensions: 700 x 570 x 450 mm
Materials: corten steel, fire bricks



Before this thesis project began, Mikael Avellan had already designed a stove and had one prototype fabricated and installed in Kopparnäs-Störsvik park. This stove is robust and functional, and the prototype proved to meet UUVI's needs excellently. Employing a steel shell for durability and a fire brick lining for heat retention and safety, the stove's depth allows for a more protected fire that burns more efficiently. As the stove design was already successful, I saw my role as that of consultant, and aimed to help make improvements rather than re-design the object entirely.

A prototype is meant to be tested, and both Avellan and myself thought of ways in which the stove could be improved. Namely the prototype stove was too small to comfortably fit the standard grates that Avellan had chosen for the grilling surface. This was easily remedied by extending the length and width of the stove by the width of one firebrick, or seven centimeters (*Fig. 18*). Constraining the dimensions of the stove to those of the fire bricks allowed the use of a whole number of bricks, making manufacturing easier and preventing crumbling bricks

during use. Clearance between the grill surface and the stove walls increased from one to four centimeters—a more comfortable fit. Additional details were also considered, such as adding drainage and ventilation holes, designing feet that could be used both on soft ground as well as anchored into stone, and adding additional range to the grill height adjustment. Modelling the stove in 3D from which dimensioned drawings could be derived allowed for an accurate representation of Avellan's concept that is less subject to misinterpretation.

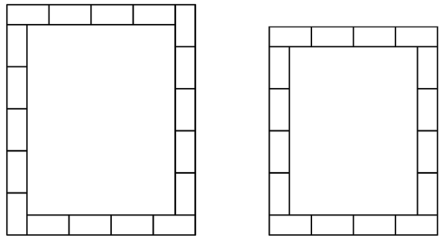


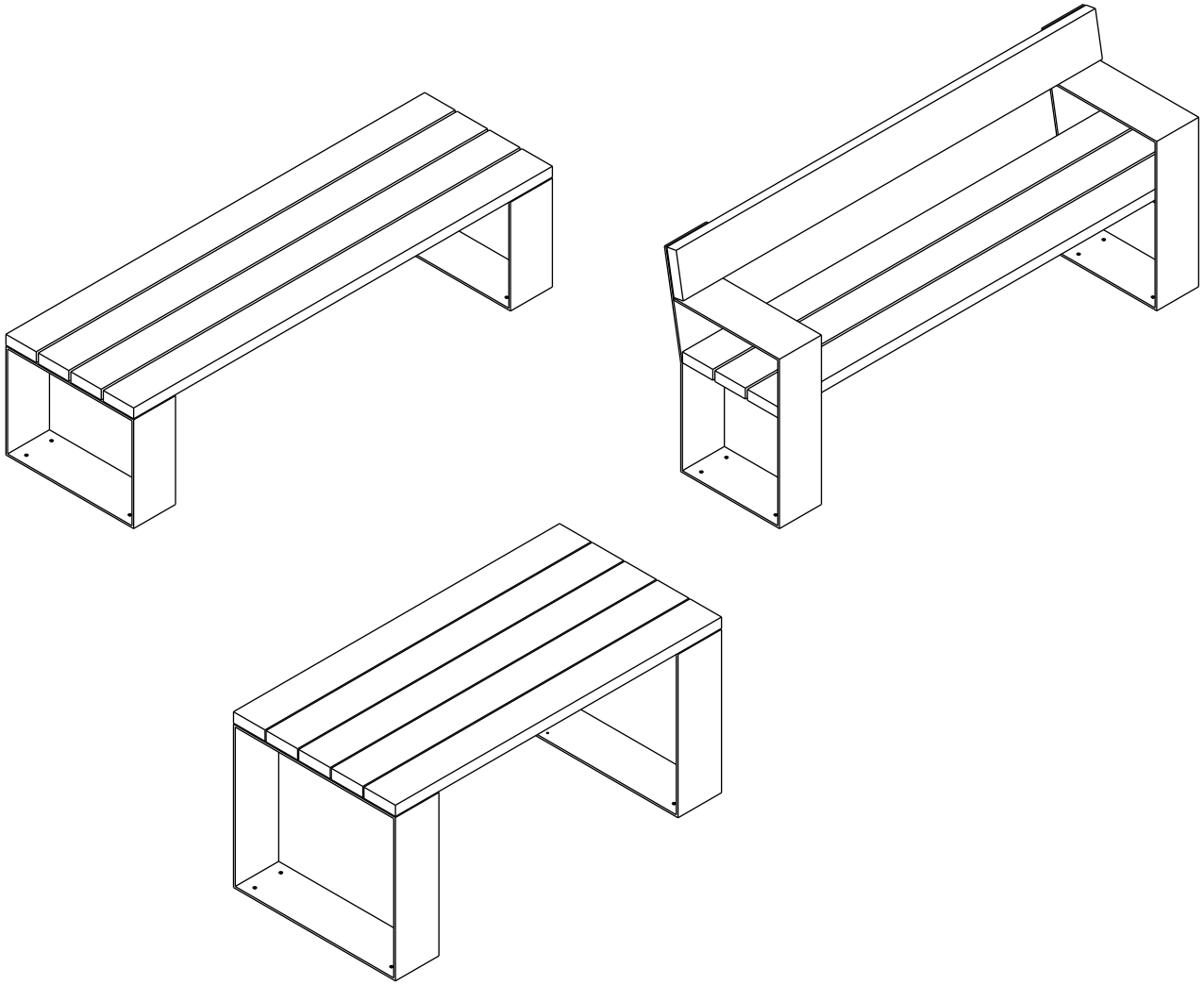
Fig. 18. New (left), and old (right) fire brick layouts

Designing the stove: overview

Co-creative method	*Project goals*	*Design solutions*	*Main iterations*
Initial design by Mikael Avellan	Safety	Firebrick internal construction keeps the stove cool to the touch on the exterior	As this was already the second iteration of a proven design, few elements needed to be revisited after initial drawings
Stove was re-dimensioned and details added	Protection from wind	Deep walls allow for easy fire starting and wind protection	Air vents and drainage holes were added to the ash drawer
	Effective for grilling	Adjustable grill height allows for different cooking methods	Grill height adjustment holes were re-oriented so that the height adjustment pin does not get hot
	Fits the wood provided to UUVI	Modular grill allows for easy and affordable grate replacement	
	Easy maintenance		

Benches and table

Dimensions: 595 x 2000 x 500 mm
Materials: corten steel, larch



It was clear from the outset of this project that the different design elements of the park should be complimentary. One of the main ways to achieve this would be through materiality. UUVI had already expressed interest in using corten steel, and were exploring the possibility of having the stove made in this material. Steel has a lot of benefits including cost and strength, and corten would forgo the need to rely on surface finishes.

When designing the benches, and with corten in mind, I started exploring different forms using both plate steel and tubing for the legs. The surfaces would be made of larch, which has remarkable weathering properties and would not need to be finished in any way, thereby reducing cost, maintenance, and maintaining a natural appearance.

Several bench designs were modelled in 3D (*Fig. 19*). A scale model was also created from thin steel (*Fig. 20*). The most simple bench, with a simple rectangular frame of plate steel, was thought to be the most elegant solution. In order to meet the needs of the most users, it was also important to

design a bench that had armrests and a back. This would be easier to sit on for those with mobility challenges, as they can lean on the armrest, and more comfortable as well. The first design for such a bench featured a floating, cantilevered armrest (*Fig. 21*). As the bench legs and arms are made from 8mm steel, the floating armrest would likely be strong enough for extended use, but would need to be tested. However, after Sallamaa did more research on the Finnish accessibility guidelines, it was clear that the armrest on this design would be too low to meet the guideline of 70cm (Verhe, Ruti and Suomen Invalidien Urheiluliitto, 2007). After raising the armrests, the proportions of the cantilevered design were no longer harmonious and the arms were extended to be connected to the back rest. This eliminated any concerns about strength and, more importantly, resulted in a bench that is more comfortable for more people. A table design was then made to follow the style and construction of the benches.

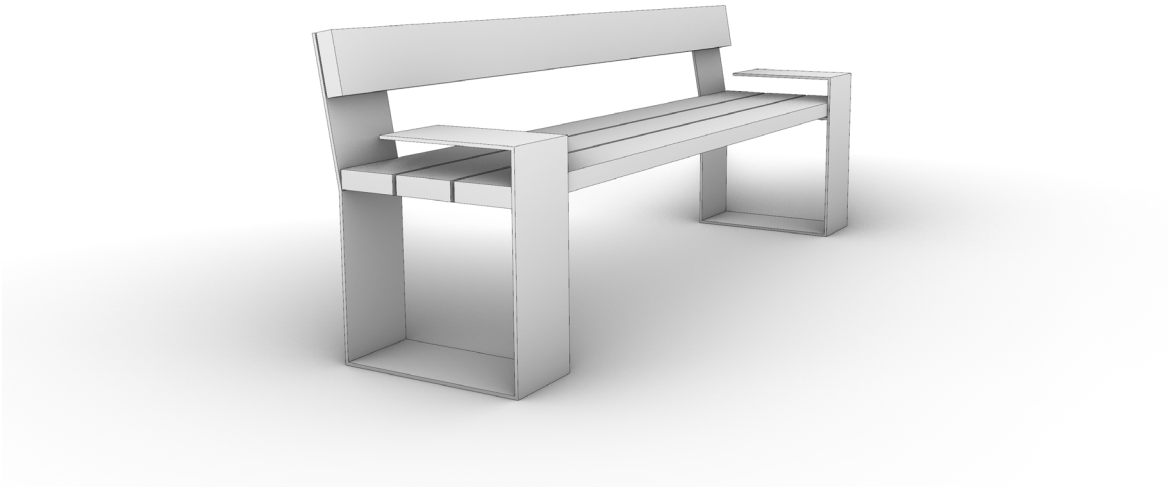


Fig. 21. Bench concept with floating armrest

Fig. 19. Several bench concepts

Fig. 20. Bench scale model, steel and wood, 1:100

Designing the benches and table: overview

Co-creative method	*Project goals*	*Design solutions*	*Main iterations*
Input from Silva Sallamaa with regards to accessibility	Comfortable Easy for people with varying abilities to use Long lasting and easy to maintain	Traditional seating dimensions followed (i.e. 10 degree back angle) Follows Finnish seat and arm height requirements for accessibility Wide arms provide a surface on which to place or prepare food, and also a place to stack wood to be ready for the stove Larch is used for its weather resistance, requiring no chemical treatment or surface finish Corten steel weathers in a controlled way that also requires no surface treatment Bench weight prevents theft or misplacement, and straightens any warped boards	Changed height and arm design to comply with accessibility code Gaps between boards decreased based on actual dimensions of lumber after physical prototype was made

6. CONCLUSION

The brief for this project seeked designs for five new infrastructure components for UUVI parks: a stove, benches, signposts, a woodshed, and a shelter. For many reasons, this was a challenging project. Each of the five elements presented their own difficulties, with the tasks growing to be larger than initially expected. From the user interviews, for example, it became clear that a table would be required, which added an extra variation to the bench design, which itself already had two variations (with and without a backrest). Similarly, the sign post had different variations to consider (directional and a signboard), as well as two different mounting methods (hard and soft ground). The larger structures became more difficult than expected through my and UUVI's ambitions, by including the sliding woodshed roof and the open frame concept of the shelter which was later abandoned. Despite the grand scope of the project, each element was successfully designed for manufacture and within UUVI's budget. Each will be prototyped and are in various states of completion.

Challenges

Shortcomings in ideation and concepting

Reflecting on the ideation and concepting processes, there are several learnings. During ideation, I eschewed any formal ideation frameworks. This was not out of disdain for such tools, but that I simply did not think to use them at the time. I considered the task at hand to be well defined, and so was not straining to find out-of-the box solutions to the problem at hand—ironically, the very mindset these frameworks are meant to challenge.

The second limitation I had faced was my inexperience with building systems and in designing structures. Because most of my fabrication experience is in small objects, I was uncertain and lacked confidence in what might be possible while constructing a new shelter. This was compounded by the fact that the shelters must be replicable: a one-off installation would not suffice. For these reasons I turned to the established construction methods of traditional framing and prefabricated profiled logs. While these methods would reduce costs and simplify production and installation, they also represent a missed opportunity. Where large buildings require the use of established building techniques for myriad reasons, small structures without electrical, plumbing, or insulation (not to mention more relaxed building codes) can be made with more flexibility. More time could have been spent in the workshop testing various joinery techniques and other possible ways to create the shelter in a way that more elegantly tied form and function.

Similarly, I regret starting so soon in 3D modelling software rather than exploring form through the use of quickly manipulated materials like foam and paper board. While CAD modelling allowed me to quickly play with ideas and scales, I believe it also limited my creativity. It was too easy to focus on details rather than thinking at a much higher level: the form, layout, and general concept of a specific shelter.

Perhaps most limiting to the creative process was the pursuit of practicality at the cost of delight. Given that the projects would be implemented and used, and that park infrastructure needs to be

supremely functional, I erred on the side of caution, and the designs arguably lack a certain "wow factor". With UUVI hoping to increase awareness of its parks, a more striking and unexpected shelter may have garnered additional attention through sharing on social media, for example. Here again early explorations of form through physical models may have proven beneficial.

Software choice

Another key challenge to this project related to the choice in modelling software. This would prove to have outsized consequences as 3D modelling was so heavily relied on in this project. As mentioned above, modelling began early in the process. This not only limited creativity, but also influenced the choice in software. Rhino, a direct (nonparametric) modeler, has a very low barrier to entry when beginning the modelling process, and was thus chosen for concepting. Rather than switch software for the design production, it seemed easier to continue using Rhino, in hindsight a mistake.

Once the models reached a certain level of complexity changes became quite laborious. A change in log height, for example, would require repositioning each log in the model. This shortcoming became most limiting with the woodshed, where countless iterations of the sliding mechanism required substantial changes to the rest of the model. Another limitation to Rhino is its limited drawing capabilities. While generating drawings from the model is undoubtedly easier than creating them from scratch, each new drawing required substantial effort to produce an adequate result, including exporting the drawings to Adobe Illustrator for final edits. So for each iteration which already required considerable changes on the model, new drawings would compound the effort. Both of these challenges could have been mitigated by using a parametric modeller with more robust drawing capabilities.

Successes

Despite the challenges, this project has in some ways already proven successful: each project element will be built and tested. Initial production units of the stove and benches have already been produced and installed in Piilolammi (p. 78, 82). The first signposts are currently being fabricated for testing, and a supplier has been chosen for the shelters and woodsheds. These larger structures are currently undergoing municipal approvals. The first shelters will be installed in Stora Halsö and Kopparnäs-Störsvik, and the first woodshed in Sarvikallio.

Based on the initial fabrications, initial changes will almost certainly be necessary for each project element—it is impossible to foresee every detail and possible complication before fabrication. This has already been the case for the bench, where the gaps between bench boards were reduced to account for the final dimensions of the lumber, and for the stove, where the grill retention pin was rotated 90 degrees so that the handle would remain cooler to the touch.

Despite the small change, the stove has already proven successful. The grill now has more room inside the stove walls, and details like ventilation holes, better grill height adjustment, and stove feet round out Avellan's already great design.

Likewise, the first benches have also proven successful. The larch boards will age to a dull grey and require little attention. When they do eventually rot or break, they can be easily and cheaply replaced. The thick corten steel legs may never need replacement. The benches have already proven popular, with the cities of Hyvinkää and Vantaa showing interest the designs.

While signposts have yet to be tested, a lot of flexibility has been built into the designs. By serving simply as a substrate upon which printed aluminum plates can be mounted, UUVI will have the ability to change the signage as required. With adaptable signage directions and dimensions, the signposts should be able to meet most needs that may arise.

Perhaps least certain of all the designs is the woodshed. If the sliding roof functions according to plan, I have no doubt that UUVI's wood filling

operations will be improved. I await the results of the first prototype eagerly, and with a hint of trepidation.

Lastly, and with the most impact to people's park visits, are the shelters. Despite a circuitous route to reach the final design, it is one that took inspiration from insights gathered through research. A dive into literature concerning the human relationship with nature led to the idea that a shelter could help foster a sense of place by enriching and encouraging nature experiences. This led to insights like ensuring the shelter had an outward focus, and honouring cultural vernaculars. This inspired the turn to the Finnish laavu as an elemental form. From user research, it was clear that people would prefer smaller more numerous shelters for added privacy and choice of location. They would also appreciate high-quality materials; for many visitors, UUVI parks serve as a sort of home-away-from home, and a good impression might encourage visitors to take better care of the service areas. Large logs with a charred finish will have a contemporary and solid feel, and have the added benefit of being enduring and easy to clean and maintain. Based off of these research insights, the smaller, laavu-inspired shelter design will hopefully prove one that people enjoy and respect.

Time will prove the ultimate test of the project's success: if the elements meet their intended purposes, if they are enjoyable to use, if they are easy to maintain, and if they are long-lasting. Confidence can be gained through the process. The designs stemmed from insights gathered from research and observation, and should meet the expectations of park visitors as well as the criteria set out by UUVI.

Perhaps most promising to the future success of the project is its modular nature. Rather than combine all the services into one structure, each element is discreet. Benches and tables can be arranged to best serve the needs of each individual park. Stoves can be moved closer to a single shelter, or between multiple shelters in heavy use areas. By using similar materials and forms between all the project elements, visual harmony is achieved.

That the designs are being produced and might see years of use lent significance to this project.

It was a privilege to design infrastructure for a public organisation and in some ways I saw this project as a way to give back to the Finnish institutions that have already given me so much.

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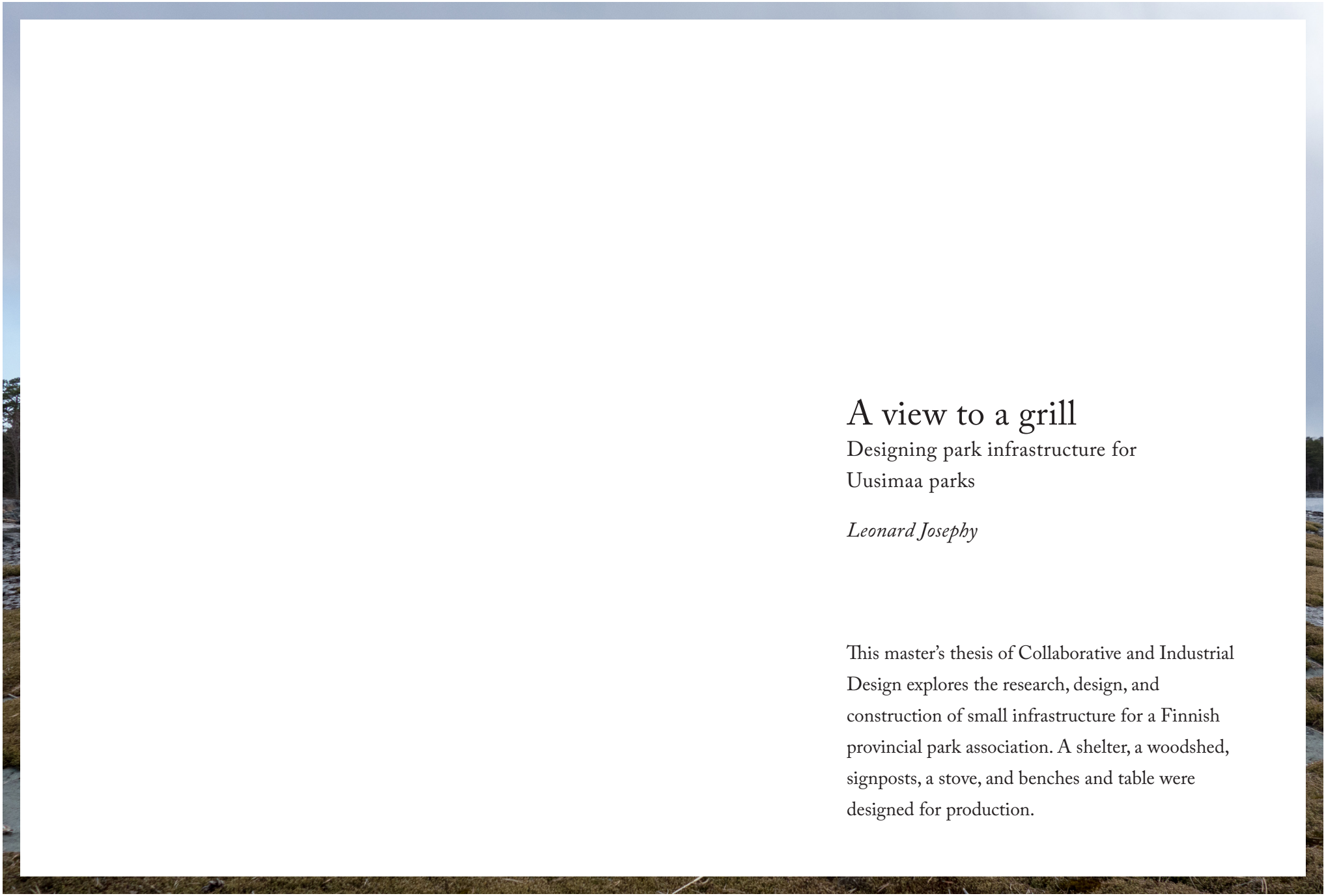

A view to a grill

Designing park infrastructure for Uusimaa parks

Leonard Josephy

This master's thesis of Collaborative and Industrial Design explores the research, design, and construction of small infrastructure for a Finnish provincial park association. A shelter, a woodshed, signposts, a stove, and benches and table were designed for production.